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Figure 1 shows four diagrams of 2D hexagonal lattices. (a) A central site surrounded by six sites. (b) A central site with one site at the top. (c) A central site with two sites at the top. (d) A central site with three sites at the top.


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**EDUCATIONAL LESSONS
FROM
WARTIME TRAINING**

COMMISSION ON IMPLICATIONS OF
ARMED SERVICES EDUCATIONAL PROGRAMS

Appointed by the American Council on Education

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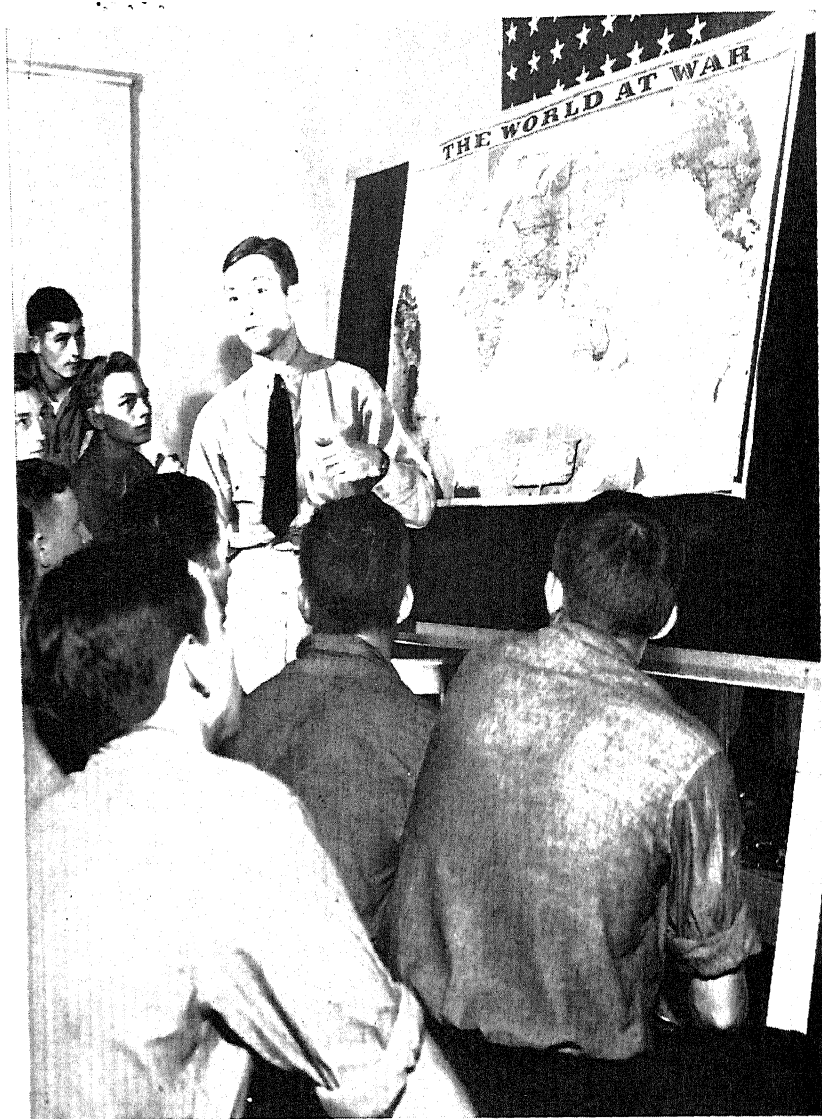
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KEEPING NAVY TRAINEES INFORMED OF WORLD EVENTS

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EDUCATIONAL LESSONS FROM WARTIME TRAINING

The General Report
OF THE COMMISSION ON IMPLICATIONS
OF ARMED SERVICES EDUCATIONAL
PROGRAMS

★

BY Alonzo G. Grace, Director, and Members of the Staff



AMERICAN COUNCIL ON EDUCATION
Washington, D.C.

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FOREWORD

IF THE PAST is to help us deal more wisely with the present and the future, we must learn to subject to critical analysis our more significant and illuminating experiences, be they successes or failures. That no such practice has yet been commonly adopted is all too evident. In general, our inclination is to close the books of experience, especially experience that is difficult or complicated, just as soon as possible; to let bygones be bygones. The result is that we frequently have to start some of our largest and most exacting enterprises as it were "from scratch." Furthermore, we do not as a rule make any real effort to carry the lessons of one field over into the practices of another. Thus, experience fails to register fully even when its lessons are far-reaching both in their direct applications and in their wider implications. With the world now in continuing confusion and conflict, this is the kind of dereliction democracy cannot longer afford.

During World War II educators witnessed the successful prosecution of the greatest emergency training program in all history. More than ten million men and women were taught to perform expertly the vast range of duties necessary to the effective conduct of modern technological warfare. The students in this program came from every section of American life. The things they were taught were of almost incredible variety. Every available means of instruction was brought to bear. No expense was spared in getting the desired results. It was an educational undertaking of tremendous scope and magnitude.

The methods employed and the results obtained in this vast training operation were bound to be of interest to organized education at all levels. In some quarters it has been thought that the armed forces staged in this training program a demonstration of educational principles and procedures that might, if their full implications were understood, actually revolutionize current civilian educational practices. In other quarters it has been argued that the war training program taught no lessons that American civilian education did not already know. Such views at either of these two extremes are presumably without warrant.

However, even this presumption cannot safely be entertained without a comprehensive review of the facts.

As early as March 1944 the American Council on Education addressed letters to the Secretary of War and the Secretary of the Navy which said in part:

At the recent meetings of the Executive Committee, the Problems and Plans Committee, and the Committee on the Relationships of Higher Education to the Federal Government, of the American Council on Education, plans were discussed for the preparation by the American Council on Education of a report on *The Implications of Military Experiences for Civilian Education*. It was the considered judgment of each of these committees that a descriptive statement of the significant education and training programs now being carried on by the armed forces would provide a source of rich material of very great significance both for civilian education and for training and education within the armed forces. It was believed that such a descriptive summary could be adequately made only by those who are now actually engaged in developing and carrying on such programs. Also, unless such a summary is prepared now while such programs are in operation, it will be virtually impossible to have them prepared in retrospect.

In making reply, both Secretaries gave warm approval to the study the Council proposed.

However, the actual conduct of the inquiry could not be initiated until substantial funds had been obtained. Fortunately, after a period of negotiation, both the Carnegie Corporation and the General Education Board agreed to make contributions which together guaranteed the necessary financial support. This made it possible for the Council, in the summer of 1945, to create the Commission on Implications of Armed Services Educational Programs which, in this present volume, is making its general report.

The Commission has had from the outset the service of a carefully chosen staff, working under the able and experienced leadership of Alonzo G. Grace. The great bulk of the work of conducting the survey and putting the collected materials through critical analysis has naturally fallen on Dr. Grace and his associates. The task of the Commission members has been to criticize reports and to exchange opinions with both staff and other Commission members, all with a view to identification and formulation of important principles disclosed either directly or indirectly by the

huge war training program. I think it can be fairly said that the relationships between the Commission and staff have been exceptionally cordial and fruitful throughout the inquiry. I should like to take this opportunity, on behalf of the Commission, to express to the staff our esteem and gratitude.

It doubtless will be a matter of regret that the findings of the Commission are not more definitive than they are. They certainly are not as definitive as one would like. This, however, would seem to be inevitable in view of the tremendous complexity of the war training program and the almost complete absence of anything resembling controlled experimentation. The fact remains that the findings appear to make a substantial contribution to the objective appraisal of current educational policies and practices. Furthermore, the findings serve to spot areas in which critical issues almost certainly lie and in which, consequently, continuing studies appear to be very much in order. In short, the practice of uninterrupted evaluation, so characteristic of war training activities, should come to prevail much more widely than it has thus far among civilian educators in times of peace. If, as the result of the report of the Commission, civilian education comes to subject its work more widely to continuous critical appraisal, the work of the Commission will have made an important general contribution over and above those which the Commission members feel sure are to be found in the present report on direct implications of the armed forces training program.

EDMUND E. DAY

November 1947

PREFACE

I TRANSMIT herewith to the American Council on Education the summary volume on the lessons of the wartime armed services educational programs for American education now and in the future. This report, while touching many aspects of the subject, presents much less detail than is contained in the nine monographs already published or about to be published for the Commission on Implications of Armed Services Educational Programs. Neither this report nor the studies from which it is largely drawn can be all-inclusive, or properly intended to preclude further research. Instead, one of the purposes is to facilitate lively study and experimentation on many features which have been identified and covered only briefly. Such efforts are now going on in various universities, school systems, and elsewhere. Moreover, actual application of principles thus derived occurs more widely than is generally supposed.

During the two-year period of this study (1945-47), I had the assistance for varying lengths of time of a staff composed of experienced educators and research workers, most of whom were fresh from wartime service as officers in the armed services or in civilian capacity. I acknowledge in particular the services of M. M. Chambers as associate director of the project; of Henry C. Herge as assistant director in charge of the studies of armed services college training programs; and of Edward C. Elliott, president emeritus of Purdue University, who conducted special studies of the impact of war upon research and graduate education and on wartime training of civilians, and who lent immeasurable aid to the planning and execution of the entire undertaking.

The authors of the published monographs summarized in this report are as follows, in the order of the appearance of the monographs: M. M. Chambers, *Opinions on Gains for American Education from Wartime Armed Services Training*; Frederick B. Davis, *Utilizing Human Talent: Armed Services Selection and Classification Procedures*; John R. Miles and Charles R. Spain, *Audio-Visual Aids in the Armed Services*; Robert John Matthew, *Language and Area Studies in the Armed Services*; William Nelson Fenton, *Area Studies in American Universities*;

Cyril O. Houle and associates, *The Armed Services and Adult Education*; Samuel M. Goodman, *Curriculum Implications of Armed Services Educational Programs*; Dorothy Schaffter, *What Comes of Training Women for War*; and Henry C. Herge, Sidney L. Pressey, Harold Sprout, Gordon K. Chalmers, Raymond J. Connolly, and Edward C. Elliott, *Wartime College Training Programs of the Armed Services*.

Other valuable studies, upon which this report is also based in part, were executed by Augustus S. Boynton (vocational education), Elwood C. Davis (health and physical fitness), Edward C. Elliott (wartime training of civilians), Marie Frauens (armed services textbooks and manuals), Samuel Goldberg (education of illiterates), Luther McRae (instructor training), Howard A. Rusk (convalescent and rehabilitation training programs), and Boyd C. Shafer (organization of armed services training). I am greatly indebted to these persons, and to a number of other contributors whose names are not mentioned here. I wish also to acknowledge the services of some one hundred persons named in Appendix A who served as members of advisory committees or as reviewers of the several studies in manuscript and gave freely of their experience and expert knowledge.

Especial appreciation is due to the Chairman and members of the Commission on Implications of Armed Services Educational Programs, whose debates on fundamental concepts at several sessions and whose personal counsel afforded frequent guidance to me and to the principal members of the staff. The Chairman and members of the Commission have concurred in the basic concepts expressed in this report.

The Secretary of War and the Secretary of the Navy cooperated in the entire project of the Commission and facilitated its progress by designating as liaison agencies respectively the Historical Division, War Department Special Staff, and the Standards and Curriculum Division, Training Activity, Bureau of Naval Personnel. These agencies provided full access to documentary materials, many conferences within their respective departments, and entree to numerous armed services headquarters and training installations. They also reviewed the

studies in manuscript, on occasion gave valuable suggestions, and finally cleared the drafts for publication as in accord with the safeguarding of information vital to the national security. Opinions and assertions contained in the studies are not, however, to be construed as official or as reflecting the views of the War Department or the Navy Department or of the military or naval services at large.

The entire undertaking of the Commission on Implications of Armed Services Educational Programs, planned and initiated before the cessation of hostilities in the war, is an illustration of the alertness of the American people to the problems and issues which confront education in America.

ALONZO G. GRACE
Director

October 15, 1947

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KEEPING NAVY TRAINEES INFORMED OF WORLD EVENTS *Frontispiece*

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Part One

**CAN WE TEACH THE GI WAY?
THE QUESTION**

I. SOME GENERAL OBSERVATIONS

CAN WE TEACH the GI way? This question was raised during the war by educators who were in the service, by civilians who had observed the training, and by others who were convinced by the writings and discussions on the subject that considerable improvement was possible for civilian education in this country.

The American Council on Education early in the war identified this problem. In the summer of 1945 it appointed the Commission on Implications of Armed Services Educational Programs, whose function was to identify features of the wartime training and educational programs worthy of possible adaptation in peacetime civilian education of all types and levels. A special duty was to make available well-considered answers to two questions: What can education in America gain from the experience of the vast wartime training effort? What are the lessons for education and the national culture and strength now and in the future?

Many published articles describing the armed services educational programs have attributed to them influences or impacts which did not emanate from these programs, but rather from the general effect that the war had on social institutions. The impact of the war service on individuals no doubt will affect civilian education. The war also revealed certain gaps, imperfections, and weaknesses in American education. Moreover, the armed services made mistakes in the development of programs. These aspects of the general impact of war on civilian education have been treated only incidentally.

Before the formulation of the project, the approval and cooperation of the Secretary of War and the Secretary of the Navy were obtained through official channels, and by this means the director and staff of the Commission had the full cooperation of military and naval personnel in Washington and in the field, and were cordially received as visitors and observers at many types of military and naval training installations during the late summer and autumn of 1945, before the postwar curtailment and dismantling of training facilities had proceeded very far. The official cooperation of the War and Navy Departments also

made possible the prompt clearance of the several reports of the Commission's staff for public release.

Fully recognizing that great contributions to the success of the numerous training programs were made by civilian educators, both as members of the armed services and as civilian advisers in various capacities, the War and Navy Departments were hospitable to the project and rendered appropriate assistance. The results of this study should not in any sense be interpreted as intrusion into civilian educational problems by the military authorities. The consistent maintenance of this helpful attitude has been invaluable throughout the project.

The members of the Commission's staff, comprising about thirty persons, most of whom worked for relatively brief periods on various specific studies for which they were especially equipped by experience, were persons who had had advanced professional training and professional careers in civilian education prior to the war. Almost without exception they had served as commissioned officers in one or another of the armed services during the war in some capacity directly connected with the training enterprises. Practically all of them have now resumed their professional careers in civilian education.

In brief, the methods of collecting data comprised the following:

1. *Staff conferences in the War and Navy Departments, and study of documents on file therein.* These conferences afforded firsthand conversations with officers in the training organization, and access to hundreds of training manuals, directives, and reports, as well as to the comprehensive histories of training prepared by all installations and services for official use and at that time restricted to the official files. The materials, including documents classified as confidential and secret, constituted a vast library to which all members of the staff had access with the understanding that confidential and secret documents would not be reproduced or otherwise given unauthorized distribution. Generous assistance was given by appropriate service personnel.

2. *Staff visits to armed services training installations of various types.* During the latter half of 1945, selected installations of all the major services, from Massachusetts to Texas, were visited

by staff members who conferred with station commanders, directors of training, supervisors, and instructors, and inspected equipment and methods of instruction. The director visited training installations in North Africa and Europe. Staff members joining the project came directly from service at installations from California to Connecticut, where they had participated in wartime training programs during their early development and at their peak loads. Several had had the opportunity to test training in combat.

3. *Inquiries sent to a nation-wide list of consultants experienced in civilian education and in wartime training.* Correspondence, including occasional formal questionnaires, was maintained with approximately a thousand faculty members and administrative officers of colleges, universities, and school systems in all parts of the United States, a large proportion of whom had only recently been relieved of active duty as commissioned officers in the several services. Practically all had had firsthand experience with one or several of the major armed services training programs, and the picture was fresh in their minds.

4. *Use of committees of consultants for special projects.* To evaluate the studies concerning health and physical training, language and area programs, technical training, off-duty education, the training of women in the services, and other similar projects, consultative committees composed on an average of about twelve especially competent persons were organized. Valuable advisory and constructive critical contributions were made. Other studies made by the Commission were submitted upon completion to selected critics nationally known as experts in the subjects treated.

5. *Inquiries sent to former trainees in armed services training programs.* Two thousand war-veteran students in twenty-three colleges and high schools from coast to coast returned answers to a formal questionnaire regarding their training experience in the services. Included were specific questions about strong points, weak points, and desired changes in the conduct of instruction in civilian colleges and schools. Six hundred former naval trainees returned answers to an inquiry intended primarily to elicit implications for vocational education for civilians.

6. *Collection of research studies and pertinent publications.*

The current educational literature of the past five years includes many articles and other brief publications on armed services training of some value. The bibliographical work in this area was an important function of the Commission's staff.

As a result of this study, the following general observations may be made:

1. The Army and Navy training programs may properly be classified in general as job training and indoctrination, all colored by specificity. Lessons in methodology for specific training are found, but few lessons for the future in intellectual freedom or a liberal education are noted. It is important to know that these programs by necessity represent training for a specific operation since war in this age requires literally thousands of specialists.

2. Civilian educational agencies, including schools, colleges, and libraries, do not have the generous financial support from national sources that the armed services had in time of war. They have no authority to select or to reject the trainee or to determine the course or occupation which he shall pursue. They do not have twenty-four-hour-a-day control over his activities, and the motivating factor of life or death as a result of how well a lesson is learned does not prevail.

3. In spite of the fact that wartime military authority is practically unlimited, it was generally exercised by the Army and Navy in World War II with a high degree of consideration for the human factor. Victory in combat was the goal sought and attained, and victory had to come first—that is war. But never before was so much attention given to the needs, desires, competence, and preferences of individuals, their morale and welfare.

4. The armed services necessarily had to operate on a trial-and-error basis. They had to produce the maximum results in minimum time. If a program failed to produce results, immediate changes were ordered. They were not hampered by tradition.

5. Although the Army and Navy have developed distinctive methods of training for their purposes, and instruction is always

a major concern of all their components, the principles applied are generally not entirely new to civilian educators. In the development of the wartime training programs, the services of civilian educators in uniform for the duration of the war and of eminent educators employed as civilian consultants were utilized.

6. Besides the lessons leading to the improvement of American education in time of peace, the wartime armed services training experience contributed greatly to the services themselves by advancing their training methods, a contribution which will prove useful in their permanent task of guarding the national security.

If all the studies of American education in our several states and at the national level were implemented, and the recommendations contained therein were placed in effect, substantial modifications would occur, no doubt, not only in the program, but also in the structure of American education. For example, our organization of local public school units makes it difficult to provide for equalization of educational opportunity. We have failed to distinguish between local initiative and responsibility and the enlargement of the community or the administrative area to a point where an effective educational program can be organized. These weaknesses in structure were sharply revealed, although many of them have been generally known for years. One of the greatest needs in education in our country is the development of a program whereby the public shall have greater knowledge concerning the structure of the system and the educational offerings. A willingness to place in effect some of the recommendations made by various commissions and committees is required.

Before commenting on the specific lessons for American education, however, a brief statement of the manpower needs of wartime and the methods and organization of training will indicate the magnitude of the program.

II. THE MANPOWER NEEDS OF WARTIME

THE BUILDING of an armed force of approximately 12,000,000 men and women in a nation which had given little thought to the possibility of war was a formidable task, miraculously accomplished. Despite our nation-wide aversion to war, our belief in the capacity of human beings to settle political problems without force, and our naïve faith in the security of two oceans and in the power of the United States always to emerge victorious in an emergency somehow or other, we produced in a relatively short time the materials and the training program necessary to fight this war.

Our 1940 state of unpreparedness is illustrated in many news releases. They tell of using disguised trucks as tanks, gaspipes as guns, and dozens of substitutes for real weapons. The opponents of conscription at that time argued that we should first determine whether an army of 1,200,000 and 800,000 reserves believed by Washington to be necessary to defend the United States could be raised by voluntary enlistment.

Gen. George C. Marshall, in his biennial report of July 1, 1945, to the Secretary of War, effectively described the crisis that confronted our country:

This generation of Americans can still remember the black days of 1942, when the Japanese conquered all of Malaysia, occupied Burma, and threatened India, while the German army approached the Volga and the Suez. In those hours, Germany and Japan came so close to complete domination of the world that we do not yet realize how thin the thread of allied survival had been stretched. In good conscience, this nation can take little credit for its part in staving off disaster in those critical days. It is certain that the refusal of the British and Russian people to accept what appeared to be inevitable defeat was the great factor in the salvage of our civilization. Of almost equal importance was the failure of the enemy to make the most of the situation.

Not only did we have time to mobilize our production and civilian defense programs—both of primary importance in any total war plan—but we had time to train a combat army. Nevertheless, without the continued resistance of our allies and the

mistakes of the enemy the war might have been prolonged for some time because of our state of unpreparedness.

From pitifully small beginnings, we mobilized our total resources, human and material. Once the critical situation became evident, all activities, including the education and training programs of the armed services, were directed toward victory. The end became more important than the means to the end.

The Army Service Forces, in order to speed up production and training, early in the war adopted a striking slogan, "The impossible we do now, the miraculous takes a little longer." This spirit was characteristic of the total war effort of all armed services and civilian agencies. Not only was it necessary to train millions for combat duty, but other millions had to be trained for the production line and for volunteer assignments in the civilian defense organization.

The training programs of the armed services provided for almost as many kinds of specialists as there are in civilian life. For example, in an infantry division of 15,000 men, as many varied skills as might be found in a civilian community of the same size were required. Transportation, equipment, and supply demanded the services of more than 1,500 men; communications, nearly an equal number; administration, 700; repair and maintenance of equipment, 450; preparation of food, 650; medical care, 600; and a variety of minor duties occupied about 1,600. All of these men had to be given specialist as well as combat training. Other branches of the service used even more specialists than did the infantry.

To comprehend the great need for specialists' training, an example might be cited from the Navy. The crew of a battleship represented at least 1,500 aggregate years of training and 2,500 years of experience. Of the 2,000 enlisted men in such a crew, all were required to have eight weeks of basic training; 500 were required to have an additional sixteen weeks of naval technical training; another 500 must have this training and an additional advanced course requiring thirty-two weeks or more; another 500 must have sea experience, or at least one term in fleet school or another of the advanced training schools. About 80 percent of the men completed the equivalent of trade school

courses during their naval service. All were required to continue study and to undergo training as long as they were in active service. For the complement of 2,000 men there were 2,000 assigned jobs, each one specialized.

It is impossible in this brief way to indicate the magnitude of our war effort, or the almost unbelievable way in which we mobilized our resources, or how we worked together as never before, in order that we might avoid the disaster which had befallen a considerable part of the world.

A few brief examples concerning the growth of the Navy, the Army, and other services will indicate the magnitude of our war effort. These few brief examples at least will show how the vastness of the undertaking was stretched and indicate the importance of time in regard to any national security program.

THE EXPANSION OF THE NAVY

Prior to the inception of its intensive shipbuilding program in 1940, the Navy had a training establishment of approximately 75 schools with an average attendance of 10,000. Two air training schools with an attendance of 865 men produced an average of 350 pilots a year. At the end of the war, the Navy had 954 schools with an attendance of 510,000. Of these schools, 455 were maintained for training officers and officer candidates, 413 for training enlisted personnel, and 86 for training both officer and enlisted personnel.

On June 30, 1944, the United States Navy was the largest in the world. It comprised more than 1,100 warships and 60,000 other craft powered by 80,000,000 horsepower, 34,000 planes, 22,000 guns mounted on vessels and planes, and a network of more than 700 depots and stations keeping a stock of more than 4,000,000 items. It was manned largely by men who had had no previous seagoing experience. As many as 87 percent of the crews of great new warships never had been to sea. Of the 2,981,365 men in the Navy at the close of 1944, 88 percent were schoolboys, workers, farmers, or businessmen at the time of the attack on Pearl Harbor.

The complexity of the training is indicated by the fact that new personnel had to be proficient in more than 450 special-

PERSONNEL STRENGTH OF THE NAVY

1 July 1940 through 30 June 1945

Service	Personnel on Active Duty	
	1 July 1940	30 June 1945
GRAND TOTAL	203,127	4,031,097
Navy . . .	160,997	3,383,196
U. S. Marine Corps	28,364	476,709
U. S. Coast Guard	13,766	171,192

PERSONNEL ON ACTIVE DUTY—BY SERVICE

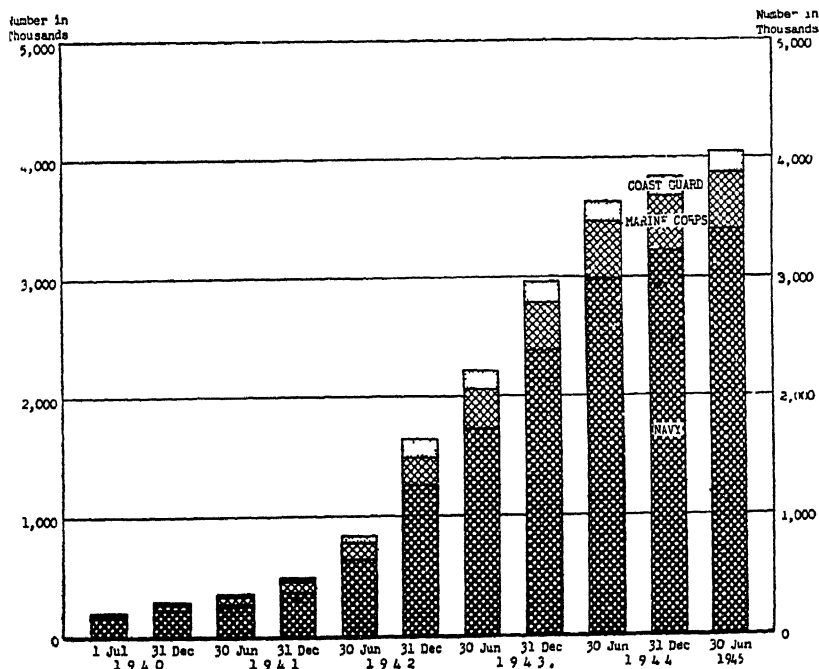


FIG. 1.—Personnel strength of the Navy, July 1, 1940, through June 30, 1945. Chart taken from *The Annual Report of the Secretary of the Navy to the President of the United States for the Fiscal Year 1945* (Washington: Government Printing Office, 1945).

ties. Training the required number of officers and men in the face of constantly changing requirements, both as to types of skills and numbers, was a challenging mission for the Bureau of Naval Personnel. New programs, such as amphibious warfare, required thousands of specially trained officers and men. Technological improvements in equipment and experience gained in combat necessitated many changes in training. Changes in strategy caused unforeseen revision of scheduled manpower requirements.

Men were channeled according to Navy needs and individual aptitude after careful selection and classification on the basis of natural abilities and civilian background. Training curriculums were standardized. Training aids and films were utilized. Men were given practical instruction on equipment of the types they would later operate and maintain.

ARMY AIR FORCES

When war broke out this country had a small air force. In fact, in 1939 only 982 pilots had been trained in one basic flying school. Even in 1940 only 9,121 men, of whom 18 were bombardiers and 44 navigators, completed courses. In 1939 only 1,609 enlisted men completed technical courses, and it takes more men to keep a plane in flying condition than to fly it.

By December 1945 our record showed that over 200,000 pilots, over 50,000 navigators, and more than 50,000 bombardiers had been trained. Flying training also included some 265,000 flexible gunners, and smaller numbers of glider pilots, flight engineers, and radar observers. The aggregate of all flying training courses of instruction, including many cases of individuals who took more than one course, was 1,572,786. The comparable aggregate for groundcrew technical training courses was 1,534,757.

ARMY GROUND FORCES

In 1940 the Nazi Army had some 300 divisions and stood ready along the Channel to attack Britain. The Italians had about 70 divisions; the Japanese, 120; Hungary, 23; and Bulgaria, 18. The Soviets had planned for more than 550 divisions;

the British, more than 50. And what did we have in 1940? Twenty-eight poorly equipped and partially organized divisions, 10 Regular, and 18 National Guard.

The heaviest casualties from gunfire or disease occur on the ground where men must fight close to the enemy. Ground soldiers had to possess not only personal courage, but also a high degree of skill in the use of the complicated mechanisms to fit them into the ground, air, and sea teams. An infantryman, for example, had to be proficient in the use of his primary weapons and familiar with the M-1 rifle, the carbine, hand grenade, rifle grenade, automatic rifle, 30-caliber medium machine gun, 60-mm. mortar, two-man rocket launcher. He was taught, also, everything from how to process contaminated water to the tricks of survival in battle.

Because of our plan for training individuals as replacements, we maintained 89 divisions of ground troops. By January 1944, 47 infantry regiments and 19 divisions had lost from 100 to 200 percent of their strength, yet all personnel losses were replaced.

TRANSPORTING MEN AND GOODS VIA MERCHANT MARINE

In 1945 practically every country allied with us received products of our war industries. For example, to the Union of Soviet Socialist Republics went, in one year, 1,800 medium tanks, 7,000 weapon carriers, 39,000 1½-ton trucks, 77,000 2½-ton trucks, 400 10-ton trucks, 9,500 motorcycles, 100,000 telephones, 500 cranes and shovels, 335 road graders, 128,000,000 feet of blasting fuse, 46,000,000 square feet of airplane landing mat, 2,500 crawler-type tractors, 100,000 wool blankets, 1,500 hospital-ward tents, 6,800 flat cars, 1,300 steam locomotives, and many other items. In fact, the list of shipments to the Soviets, to Britain, to China, and to other countries reads like the index to a mail-order catalog. Everything from ammunition to zinc products was included. This meant the training of millions for production lines.

The merchant marine not only is a vital national delivery system, taking abroad and picking up the materials that keep our economy running, but also it is an arm of international policy.

During the war the U. S. Maritime Service, the U. S. Merchant Marine Cadet Corps, and the Maritime Academy had training programs. The training organization eliminated cultural courses and greatly shortened technical courses. Training aids and devices were widely used.

To comprehend the task undertaken by the merchant marine, note the following figures: The tonnage of ships on January 1, 1942, was 11,000,000; the tonnage built during the period January 1942 to April 1946 was 54,500,000. During the war, 5,300 ships were built, 2,700 of which were Liberties. On January 1, 1942, there were thirty-three Maritime Commission shipyards. That number rose to seventy-two during the war. Maritime Commission shipyard employment on Maritime Commission contracts before the war was 120,000; at the peak, in August 1942, it reached 700,000.

In 1939 the British Empire controlled about one-third of the world's ocean shipping, and the United States about one-seventh. Now the United States has more than the rest of the world, all told. During the war, 268,283,000 tons of cargo moved in ships flying the United States flag. Nine out of ten men crossed the ocean in United States ships.

The Maritime Commission was directed in 1942 to build 18,000,000 dead-weight tons of shipping. The goal was exceeded: 16,000,000 tons was the mark set for 1943, and 19,000,000 were delivered. By the time the United States forces entered Tokyo, more than 4,500 merchant ships built in United States wartime shipyards were at work for the allies. There were 270,000 men sailing our ships in 1945, compared with 55,000 officers and men in the 1941 merchant marine.

SOME FACTORS CONDITIONING WARTIME TRAINING

Men had to be trained to fight under all conditions, everywhere in the world. Technological changes and inventions came so rapidly that weapons which were up to date when men used them in training often became obsolete by the time those men went into action. Telescopes and radar sets often were out of date before they reached battle. The P-40 was a good fighter plane in 1940, but it was obsolete by 1942, except

for training. The Springfield, an excellent rifle, was soon superseded by the Garand and the carbine. Little of the finest equipment of 1942 was of much combat worth in 1944.

Facilities and Resources

During the early part of the war, it was estimated that the cost of training an aviation cadet from the time he entered preflight training until he finished advanced training and received his wings—a period corresponding to one academic year—was \$20,000. Twenty weeks of instruction for communications officers, not including food, clothing, and equipment, offered at one university is said to have cost approximately \$3,000 for each trainee. The twenty-two weeks of instruction for enlisted radio operators in the Army Airways Communications System at one training station is estimated to have cost \$3,000 a trainee.

Armed services instruction of types which correspond roughly to technical instruction at the college level in civilian institutions was approximately four times as costly. The cost of training flying personnel was perhaps twelve times the average cost of college instruction in civilian institutions. These great differences are easily accounted for. Aircraft and fuel in quantities sufficient for the training of flying personnel took enormous amounts of money. In technical training of groundcrew members, expensive technical equipment had to be readily accessible.

The pay of instructors, whether commissioned, enlisted, or civilian, compared favorably with that of teachers in civil life. A corporal or sergeant received better pay than most civilian teachers in elementary or secondary schools and better than that of many college instructors, when it is taken into consideration that his shelter, food, clothing, medical care, and complete maintenance were all supplied in addition to his monthly base pay of from \$60 to \$80, plus the contribution of the government to an allotment for his dependents, as well as exemption from federal income tax to the extent of \$1,500, plus many other minor financial advantages.

Armed services training was, of course, far better supported financially than civilian education in peacetime is generally supported in this country. This fact must be taken into considera-

tion when one plans improvement of civilian education based on lessons learned from the armed services.

Incentives to Study

"Playing for keeps" was regarded by civilian educators as the factor that more than any other distinguished military from civilian classes. Such incentives as an officer's commission, a raise in pay upon achieving a goal, a rise in rank, and an elevation in social status created inner drives that motivated student proficiency. Another factor was fear of separation for academic failure, lack of officerlike qualities, illness or physical deficiency, or conduct unbecoming an officer candidate. The disgrace related to separation and the realization that opportunity of ever becoming an officer might be lost were also drives that forced men—particularly in the Navy V-12 program—to a high degree of application.

Most men were proud of the confidence placed in them by selection boards. Many such urges made men conscious of the need for gaining proficiency in subject matter and skills that were directly connected with duty assignments only days removed from the classroom.

Most compelling of all, death, or rather survival, was a factor in learning. In civil life there are no comparable incentives. In fact, educators have paid too little attention to motivation as a factor in the learning process. Too much emphasis has been placed on credits, semesters, and time-clock calendar procedures regardless of how much is learned or how mature the student is. Educators fear that the measurement of learning may lead to the criticism that standards are being lowered unless what the student has memorized in preparation for an examination is measured.

The Trainees

The young men who entered the armed services were the cream of the nation's youth. There were, however, almost as wide variations among them in intelligence, education, and health as one finds in civilian schools. The Army Air Forces and certain other services obtained a greater percentage of the highly intelligent and better educated. The Air Forces, for example,

attracted and were given a high percentage of men with good scores on the Army General Classification Test.

Inductees who had civilian experience often were assigned to the services for two reasons: (1) the skills required by the services corresponded with those most common in civilian life, and (2) the Army's enlisted classification system was based largely upon an analysis of civilian, rather than strictly military, jobs.

The educational background of Army trainees showed that of 7,144,000 men 32.6 percent had completed one to three years and 27.6 percent had completed four years of high school. More than 10 percent had from one to four years in college. Only 1.5 percent of the officers and 28.6 percent of the enlisted personnel had completed only grades 1 to 8. In other words, the nation experienced less difficulty in its training program because of the educational background of the trainees.

CIVILIAN PERSONNEL

In addition to military inductees, each branch of the armed services required intensively trained civilian personnel by the thousands. Millions of men and women possessing special skills were needed also for war industries. Moreover, every government and social agency required thousands of workers who had to be trained or retrained for specific duties. This amazing capacity to mobilize human and material resources in a limited time constituted our margin of victory. We did have time, this time.

III. THE METHODS AND ORGANIZATION OF TRAINING

ARMED SERVICES training was often dreary, boring, dirty. The training camps of World War II did not have the cheery atmosphere of school or college. Men were often compelled to do things they hated and perhaps would not have done without the compulsion of discipline and patriotism—digging foxholes, cleaning latrines, drilling, learning to strip a rifle, endlessly repeating a single operation. These and similar activities were common and basic realities of training.¹

The end of all wartime training was victory in combat. The soldier and his unit (team) had to be trained to meet the enemy and destroy his military effectiveness. No matter how remote from the war a particular type of instruction might have seemed, its ultimate aim always was the same. The training of watch repairers at Aberdeen, Maryland, of infantry riflemen at Camp McClellan, Alabama, of pilots at San Marcos, Texas, and of engineer riggers at Fort Lewis, Washington, had one and the same paramount objective: the systematic destruction of the enemy's manpower and resources. To attain this objective, the training was designed to develop in the individual the ability and desire to take the offensive. If instruction included defensive skills, they were regarded only as a means to the final end—offensive action.

Through military training, individuals and their units were to acquire those qualities which would make them aggressive and capable. Such qualities included discipline, good morale, technical proficiency, teamwork, adaptability, health, strength, endurance, leadership, tactical proficiency. Of these, tactical proficiency was the most important. In fact, all phases and objectives of training can be understood only in the light of how they contributed to combat skills, for these skills were the

¹ Here and at other points of the first half of this chapter, much of the wording is excerpted, by permission of the author, from the manuscript copy of the complete study of the training of the U. S. Army in World War II, by Boyd C. Shafer, which is in preparation and will be published by the Historical Division, War Department Special Staff, in its extensive series of volumes, "The U. S. Army in World War II."

criteria by which all else in training was evaluated. Judgments of wartime training are possible only when what happened on the battlefields of Europe and the Pacific area is fully considered, for it was at Saint-Lô and Kwajalein and in the skies over Berlin and Tokyo that training met its test.

Victory was won also by the acquired skills of individual men and units who supplied and served soldiers and combat teams. Whether a man excelled as an automotive mechanic in Ordnance, a laundry-machine operator in the Quartermaster Corps, a Diesel mechanic in Transportation, or a sanitary technician in the Medical Department—what counted was how his skill contributed to the destruction of the enemy. A finance clerk at a Zone of Interior post such as Fort Benjamin Harrison, Indiana, might be far from the sound of gunfire; nevertheless, he was a cog in the machine that was delivering the “goods” on Omaha beachhead or Leyte, and he was trained to be just that cog.

It is true that men were also trained how to think; they learned certain theories and scientific principles. Moreover, a great number of trainees got new notions about “spacious living,” but these were not ends. If learned, they were the by-products of other training goals.

DEFINITION OF AIMS

Training aims were nearly always concrete and limited, *ad hoc* rather than general. The primary object was not to teach men all there was to know about anything. It always was to teach them how to perform a set number of operations or duties as individual members of a disciplined team (see Figure 2). The Air Forces were training, not pilots who knew all about the theory of flight, but pilots who could fly planes in combat. The Corps of Engineers trained, not civil engineers, but engineers who were bridge builders or demolition experts. It can be argued that this is not education, but specialized assembly-line technical training.

Jobs were analyzed and divided into component skills. Navigators seldom learned how to pilot planes. In fact, they did not even learn everything a navigator ought to know. They learned only how to navigate with Army or Navy equipment in

WHAT WILL BE TAUGHT

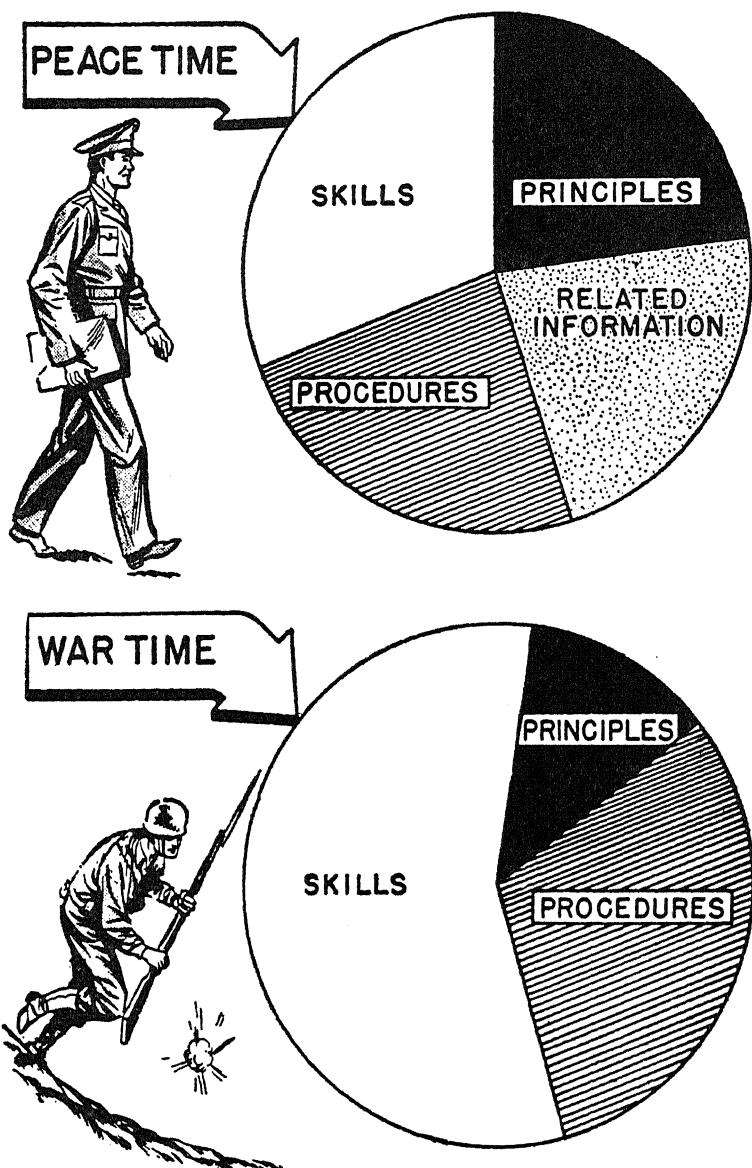


FIG. 2.—Comparison of peacetime and wartime objectives of Army training. Chart taken from TM 21-250, *Army Instruction*, p. 17.

Army or Navy planes in combat. Riflemen did not receive advanced training on machine guns. Tank drivers did not receive instruction in how to perform major repairs on their own tanks. Each man assigned for instruction in an enlisted man's occupational specialty, of which there were 534, was given the same more or less standardized training in that specialty. When he completed that training, he could perform according to Army standards a certain operation in a definite way and he could replace another similarly trained man without great loss to team or unit efficiency.

Time was always too short. Until June 1945 the pressure of the enemy was tremendous. Men had to be trained quickly. Time did not permit the development of the well-rounded individual or even of the all-round soldier. Speed, specialization, and standardization were the imperatives.

The armed services would have preferred to be more leisurely and to give all trainees a greater variety of training. The services, however, acted on the premise that time was of the essence. It follows that men had to be taught not what it would be *well* for them to know, but what they *must* know in order to survive individually and help the team to win. This was graphically impressed upon all concerned by the widely circulated chart "The Instructor's Bull's-Eye" (see Figure 3).

A soldier in training heard again and again, "You're learning this because it could help save your neck."

By 1941 and throughout the war, the armed services came to believe in what were termed "orientation" and "information and education." On the theory that an informed soldier was a better soldier, the Army for the first time in its history carried on programs of on-duty indoctrination and off-duty education. The mission of these programs was "to create and maintain in officers and enlisted men a feeling of individual responsibility for participation in the war and to strengthen the individual's efficiency as a soldier by increasing his understanding of why we fight, keeping him informed as to the course of the war and news of the world, and giving him opportunity to add to his effectiveness through off-duty individual or group study."

HOW MUCH WILL BE TAUGHT

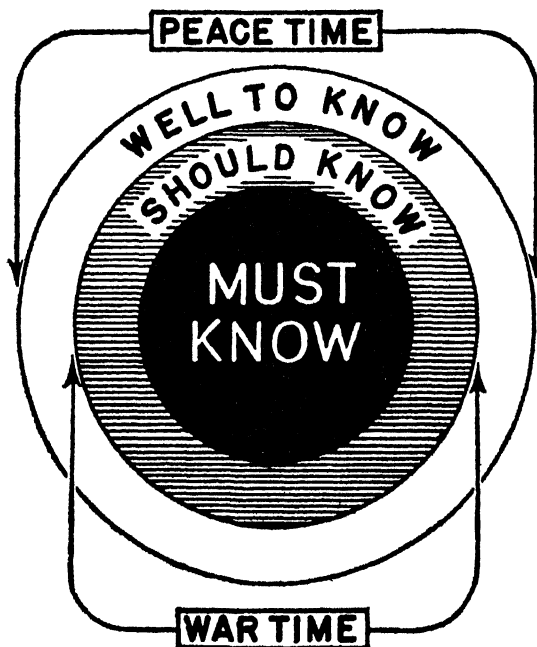


FIG. 3.—The Instructor's Bull's-Eye. Chart taken from TM 21-250, *Army Instruction*, p. 18.

Whether a man learned the "how" of an occupational specialty or the "why" of the war itself, his training was primarily designed to increase his tactical proficiency. The query most often met in training camps of World War II was "How does it work?" And to this question there usually was added another, "Can you do it under combat conditions?" Training was satisfactory when the answer was "Can do."

LEARNING BY DOING

In the early part of the war there was a tendency to make the instruction too theoretical and to include too little visual demonstration and opportunity for actual manipulation. It was not uncommon to find large classes, in poorly arranged classrooms with poor acoustics and poor lighting, attempting to listen to a lecturer far down in front who scribbled on a small blackboard.

These conditions were largely due to the pressure of time and to shortage of facilities and instructional equipment for the rapidly increasing numbers of trainees.

The Commanding General of the AAF Technical Training Command inspected many training installations early in 1942, and was convinced that radical change was needed. His headquarters issued a directive which ordered all chairs removed from classrooms. Blackboards likewise were to be taken out. Instruction was to be accomplished entirely by the so-called "practical" method. Classrooms were to be equipped with a small table for every six or eight students. On these tables would be placed the particular mechanism to be studied during the instruction of the day, and the students would stand—not sit—around the table, each having an opportunity to handle and manipulate the mechanism. Each small group would have an instructor or an assistant instructor. At times the burden of instruction would be carried by a chief instructor who stood in the center or at the front of the large room.

One immediate obstacle was the enormous difficulty of acquiring a sufficient supply of equipment to be used in the manner indicated. Another drawback was the fact that there were certain technical courses to which this plan could not well be applied. Training in meteorology and weather observation and forecasting can scarcely be conducted entirely by the methods indicated in the directive. Subsequently supervisors and instructors for the most part interpreted the directive with the latitude dictated by the needs of the particular subject and the local conditions. Before the end of the war, most supervisors in technical training believed that the complete elimination of lectures and blackboards was not successful. The impression was current that the use of strictly limited lectures of not more than ten or fifteen minutes in length is occasionally good practice, and that proper use of blackboards is a substantial aid to learning which should not be entirely dispensed with. Thus, during the course of the war, the technical training courses gradually swung back to a moderate and diversified method of instruction—a middle-of-the-road method which embodied the best features of both extremes.

One of the principal points of interest to civilian educators is the question whether the practical method of instruction can be more widely employed in civilian schools than formerly.

THE GENERAL METHODS OF INSTRUCTION

All types of instruction were used in the armed services. Those approved by manuals on instruction were: lectures, conferences, demonstrations, group performance, coach-and-pupil. The *lecture* was preferred only when one instructor presented a subject to a large group or when it was desirable to orient students at the beginning of a course. Although the lecture might be employed frequently in training officers and occasionally noncommissioned officers, it was declared to have limited value for all other training. In *conference*, the instructor could determine whether he had been effective and the student could clear up points he did not understand. A *demonstration* of most basic subjects, practically all technical subjects, and tactical maneuvers by expert school troops made a lasting impression upon trainees. *Group performance*, by the slow-motion or step-by-step procedure, which might be used, regardless of class size or organization, was declared to be "excellent for instruction in various technical operations." It was also considered a good method for introductory training in basic subjects, particularly when well-trained instructors were scarce. The coach-and-pupil method was never to be utilized at the introductory stage. Its greatest usefulness was considered "to be found in instructing large groups of individuals" that had passed through other methods of instruction.

These five methods were most frequently found in the training camps, but many others were used. The ingenuity of the nonprofessional Army teachers was in the best American tradition. Actually the lecture was the method most employed. Though it did not afford an opportunity to ascertain student reaction, it was the easiest and fastest method of "getting across" essential information, and for the unskilled instructor it was probably the least difficult to put into practice.

Instructors were also supposed to use the following five definite mechanisms of instruction: (1) *Preparation* by the in-

structor. "Careful planning is always the first step," and the "instructor must have mastered the subject." (2) *Presentation*. The instructor explains to the student "what he is to learn and why he is to learn it," and then gives brief explanations which excite interest, followed by graphic step-by-step illustrations to aid the student in remembering points brought out in the explanatory phase. (3) *Application*. Through practice the student acquires further knowledge and develops skills. In other words, he learns by doing. (4) *Examinations*. Tests are given to review essentials and to determine the student's knowledge. (5) *Discussion and a critique*. At intervals after, as well as before examinations, the instructor sums up and clarifies (see Figure 4).

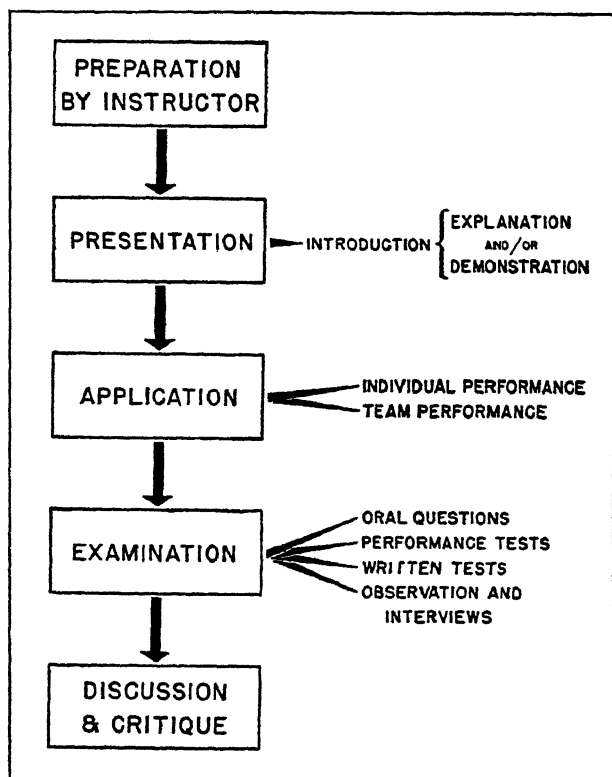


FIG. 4.—Stages of instruction. Chart taken from TM 21-250, *Army Instruction*, p. 6.

These mechanisms of instruction were, of course, not always correctly employed or always used. Instruction in the armed services varied from what the GI characterized as "lousy" to a level equal to that of the finest in America. Instructors occasionally came to classes unprepared. Their explanations at times were long-winded and obscure. Sometimes demonstrations were not given or, if they were, succeeded only in confusing the student. Application, though heavily emphasized in technical training, occasionally was forgotten. Tests were not always of high quality and were not always followed by critiques. And discussions sometimes became weary monologues on the part of the instructor. Nevertheless, the quality of instruction in the armed services was at least equivalent to the average of that found in civilian schools and colleges. Occasionally it was outstanding.

Training Film 7-295, *Military Training*, is a masterpiece of instructor guidance. FM 21-5, *Military Training*, and TM 21-250, *Army Instruction*, were instructor bibles. Army instructors tended to follow the principles these explained. When they did not, they were subject to censure.

Realism in Training

The armed services tried constantly to introduce realism. In combat inoculation courses, infantry trainees with battle equipment crawled under barbed wire while bullets sang thirty inches above them, and they attacked "enemy" strong points with live grenades and rifle fire while TNT charges burst close by and dummy enemy soldiers dropped from trees upon them. The clerk in training worked upon actual company morning reports and sick books. The Signal Corps student learned to take code while a loudspeaker boomed battle noises. Engineer trainees learned to build bridges under primitive conditions and out of such makeshift materials as they might find in the combat zone.

Training Aids

As it was with methods, so with training aids. Every conceivable type of training aid was utilized. Films, filmstrips,

charts, mockups, cutaways, sand tables, and actual equipment are representative of the myriad varieties. Aids were created for every subject and for every teaching purpose. If men were to be taught how to attack a Japanese village, a Japanese village was erected. To train men for battle, infiltration and close-combat courses were planned. Training aids—visual, auditory, and olfactory—made possible realism and increased teaching effectiveness in all situations.

Certain aids were in general use; others were used in only one branch or part of a branch—for example, a mockup of an navigator's E6B computer. Some of the most valuable aids were improvised by training-aids officers and individual instructors in local training installations to demonstrate a specific mechanism or operation. From the War and Navy Departments down to the lowest echelons, training-aids divisions and officers were part of every command, and central distributing points existed all along the line. Training centers and schools as well as most units of any size, had a section whose duty it was to supply training aids to instructors and to supervise their use in the classroom. The instructors themselves were given great freedom to improvise their own aids.

Unfortunately, the services did not have time to evaluate the effectiveness of many aids. Possibly the best aid, when it could be obtained, was the equipment itself. Tank repair could best be taught on tanks.

Frequent Achievement Testing

Tests of achievement were given frequently, and trainees were promptly informed of their standing. Since this practice involved an enormous amount of work, it was necessary to maintain at each training installation of considerable size a staff of testing experts who gave full time to constructing, scoring, validating, and otherwise perfecting achievement tests. This work was accomplished in considerable part in cooperation with the instructors and supervisors who carried the burden of instruction from day to day.

Few of our large universities or large city school systems maintain staffs of psychologists to prepare and revise objective

tests of school achievement, on a basis comparable with that in the armed services. Any institution or system of schools having as many as 10,000 students falls far short of performing its functions fully unless it has a staff of testing experts working in cooperation with its teachers and supervisors.

There is an important place for national and state agencies in the testing field, but great danger lies in complete reliance upon exclusive centralization of this service at any one point. Achievement tests are so closely related to instruction and so likely to limit the scope of instruction that there must always be a considerable degree of decentralization of their sources. The danger in centralization is naturally least where the work of the central agency is offered on a purely optional basis, as has been the case with the enterprises of the Cooperative Test Service of the American Council on Education and many other tests offered at the national and state levels. There is no substitute, however, for a local trained staff of testing experts in each institution or school system of considerable size.

Elimination of Failing Students

Trainees selected for technical specialties in any of the services, or for flying training, were usually sent as individuals to appropriate installations for "school-level" training for designated periods, after which they were assigned to operational units which received periods of "unit training" before proceeding to one of the zones of operations. The methods used in individual training at the school level are emphasized at this point.

With thorough objective achievement tests administered as often as weekly, and with prompt notification of each student of his standing on each test, it was possible at any time in any course to discover which students were falling below the standard of accomplishment set for all, and which were near failure. It was common practice to give weak students individual attention for a few weeks, perhaps by a roving instructor, or more frequently, in voluntary evening classes of small numbers of trainees. If after such attention a student continued to fail on his examinations, he was dropped by a faculty board on which

there were not only academic instructors and supervisors but a medical officer as well.

Before eliminating a student, the board interviewed him and inquired into his background and the possibly remediable causes of his failure. The board also recommended a next assignment of the student. This was in the interest of the government, which wanted manpower sent where most needed. It was also in the interest of the trainee to place him, if possible, in the post in which he would be likely to succeed.

Eliminations at frequent intervals during the course produced a mobility among the student population greatly in contrast to the comparative stability characteristic of the long academic year in civilian schools and colleges. Attrition rates were not relatively excessive. Students whose deficiencies could not be corrected were not ignored or allowed to drag along for months. They were promptly eliminated in a manner characterized by justice and a concern for the interests of both the government and the trainee. Here is an implication for civilian schools. The flexibility of scheduling which enabled failing trainees to be shifted to other courses or to resume courses in which they had lost ground is seldom practiced in civilian schools.

Practical Testing

It is important to note that the armed services used actual tests of performance of the required skills whenever practicable. The best practical test of a radio mechanic is to place before him several devices that he will be expected to keep in repair, each of which has a defect which he is required to locate and correct. Such tests were used in the final examinations of radio operators and mechanics. Similar tests were used in many other technical courses, wherever they could be devised, to supplement pencil-and-paper achievement tests. Possibly a similar type of practical testing could be used far more widely in liberal and professional education than is now the case.

Small Classes and Individual Instruction

Basic scientific subjects, the academic part of ground school instruction of prospective military aviators, were taught in classes

of from twenty-five to fifty students, which corresponds to the size of class common to civilian schools. In most technical courses, instruction was given in groups of from six to fifteen trainees. Moreover, much of the advanced ground instruction of prospective bombardiers and navigators was such that the ideal ratio of graduate to instructor was no more than three or four or five to one. Actual flying training of all flight personnel—pilots, bombardiers, navigators, radio technicians, and others—was for the most part strictly individual. The armed services could use these methods of instruction because they had command of virtually the entire manpower of the nation.

The armed services, then, attempted to teach men how to do a particular job, a job believed essential to win the war. Human frailties existed in the military as they do in civil life, and occasionally a local training commander may have seemed more anxious to make a good showing on routine inspections than to accomplish specific training jobs. Because of changing technology and revisions of high strategy, men were sometimes trained for one job or one climate, but suddenly found themselves doing another job in a different climate. Changes in plans or in the battle situation found men being trained for jobs that no longer existed. Several thousand Air Forces men were assigned to the infantry in late 1944, and many other men were transferred from the jobs they had learned to jobs about which they knew little. All available records show that training generally was planned with one paramount objective in view—victory in combat.

Men were taught skills required by modern war; they were taught swiftly to do one specific job or series of skilled operations, often without great regard for their own particular preferences. The prescribed methods of instruction were as good as the best in civilian education and, in fact, were usually drawn from the practices and experiences of civilian educators. In the ultimate test—battle—armed services wartime training fulfilled the objective set for it.

The principal characteristics of armed services training, then, were (1) clarity of objective and definition of aim, (2) learning by doing, (3) recognition of the end as more important than the

means to the end, (4) standardization of methods of instruction, (5) liberal use of learning aids, (6) wide use of tests, and (7) provision for small classes and individual instruction.

ORGANIZATION AND ADMINISTRATION OF THE TRAINING SYSTEMS

Armed services training was centralized to a degree that is not practiced in American civilian education. This does not imply that our civilian educational system can, or should, adopt *in toto* the plan of wartime military organization, but that the success of the War Department and the Navy Department in organizing and conducting vast training systems might suggest for American education certain next steps in organization and administration that are in harmony with peacetime traditions.

Groups of experts supervised broad divisions of the program. Within the Navy Department, for example, the Training Activity of the Bureau of Naval Personnel comprised four divisions: (1) Standards and Curriculum, (2) Field Administration, (3) Training Aids, and (4) Quality Control. Coordinated sections of the Standards and Curriculum Division carried five functions, namely, billet analysis (known in civilian life as job analysis), curriculum, instructor training, tests and research, and educational services. In the Quality Control Division two closely coordinated sections, Operational Liaison and School Liaison, conducted continuous firsthand studies of the performance of graduates in the fleet and at training installations and recommended modifications in training programs and practices.

Similarly organized special staffs which functioned at the lower echelons were to be found at hundreds of major training installations. In civilian education there are but few scattered parallels. The large majority of schools do not have special staffs such as those that constituted an essential element in the armed services training. It should be remembered, however, that we are speaking here of conditions which existed during a relatively short period when the armed services enjoyed priorities and advantages superior to those ever accorded to civilian education.

The wartime armed services with their highly centralized

and amply financed vast training system conducted an educational enterprise on the largest scale in history. Education, however, is primarily not an instrument of force and destruction, but one of peace and prosperity and human happiness and well-being, which constitute our long-term national purposes. For their advancement in peacetime they require a somewhat different organization from wartime; but the lessons of the wartime experience are clear and compelling and applicable within limits.

Part Two

DEVELOPING HUMAN RESOURCES

DEVELOPING HUMAN RESOURCES

1. The national security, as well as the possibility of attaining humane and democratic world organization and leadership, depends upon identifying, nurturing, and using individual human talents in the public interest. This is the task of education and industry as instruments of peace, prosperity, human happiness, and well-being.

2. Development and application of the principles and practices of sound educational counseling and vocational guidance of individuals at all age levels is a supreme obligation, resting alike upon public and private agencies of education and industry, and requiring their constant and widespread scientific evaluation of educational outcomes.

3. The activities of the armed services in bringing some four hundred thousand illiterate inductees up to the standard of literacy in the fourth grade in from sixty to ninety days of approximately half-time instruction provide a challenging demonstration of the possibility of eliminating adult illiteracy throughout the nation.

4. The physical and mental reconditioning of convalescent members of the armed services, and the occupational rehabilitation of the disabled, as well as the successful utilization, during the war, of handicapped persons in the armed services and in civilian capacities, point the way to large-scale advances in the profitable and humane use of the entire manpower of the nation, and the abolition of the cruel concept "unemployable human scrap heap."

5. Selective Service rejection of one-third of the nation's military manpower on account of deficiencies in health and physical defects glaringly exposes the fact that national standards of medical care, health services, safety provisions, and health education can be improved.

6. The generally excellent standards of housing, sanitation, nutrition, physical training, and recreation maintained in the wartime armed services have created a widespread popular demand for better local and nationwide achievement in these areas, and emphasize the fact that the existence of citizens as individuals or families "ill-housed, ill-clothed, ill-fed" or without access to facilities for physical education and recreation is of vital national concern.

IV. FINDING AND UTILIZING HUMAN TALENTS

THE MOST important considerations in determining a man's assignment in the armed services were his abilities and the military need. Freedom of choice on the part of the individual was frequently sacrificed in the interests of speed and necessity. In civilian education, the value of scientific procedures in educational and vocational guidance lies not so much in the increased efficiency with which they permit schools and colleges to utilize staffs and equipment as in the more intangible benefits that result from encouraging individuals with exceptional or specialized talents to study and work in fields that match their maximum abilities and in which they can make their maximum contribution to society.

CLASSIFICATION PROCEDURES IN THE ARMED SERVICES

The outbreak of war in Europe in 1939 found this nation's armed forces without adequate personnel selection and classification procedures and materials, and without technicians to prepare them. Yet the Army and the Navy had to prepare for testing and classifying personnel in tremendous numbers.

When men reported at an induction station, their eligibility for induction was determined by means of physical and mental examinations and interviews. Of the men who passed the medical and psychiatric examinations, high school graduates were accepted without further test; those with less schooling were required to take a qualification test. Men who could not pass that test were examined further to determine whether they could become useful members of the armed services after a brief period of elementary school work in a special training unit.

From the induction station, men assigned to the Army were sent to a reception center where the Army General Classification Test and, at times, other examinations were administered. Each man was questioned by a trained interviewer who filled out a Soldier's Qualification Card, which carried all important

information about him. This card became the man's cumulative record and was transferred with him wherever he went in the Army. Its contents furnished the basis for initial classification and any subsequent reclassification that became necessary.

Men assigned to the Navy were sent to a recruit training center, and those for the Marine Corps to a recruit depot. There the Navy Basic Test Battery was administered to them, and Personnel Qualification Cards were filled out, which served the same purpose as the Soldier's Qualification Card.

A soldier was usually sent to a replacement training center for preliminary training and further classification. Specialized tests were given on which minimum scores were required to qualify him for admission to certain courses of training. Similar use was made in the Navy and the Marine Corps of the test scores achieved in training centers and recruit depots. For example, qualifying scores were established for admission to more than forty-six enlisted training programs in the Navy.

Little testing was done of officers entering the Army, the Navy, or the Marine Corps by direct commissioning. Some of these men were specialists recruited for highly specific tasks. The Navy did not obtain as large a proportion of its officers by training enlisted men as did the Army through its officer-candidate schools. Consequently, the Navy, in selecting officers from among civilian applicants and classifying them for duty assignments or for additional training after completion of indoctrination school, used certain tests in addition to the usual interviews and the physical examination.

The Army used the data on its men's qualification cards and service records as a guide to proper assignment after graduation from officer-candidate school. Both the Army and the Navy used selection tests extensively to examine applicants for flight training. In addition, the Army Air Forces employed an elaborate battery of tests for aircrew classification.

Women who applied for enlisted status in any one of the armed services were required to meet certain standards of age, absence of parental responsibility to young children, and educational background, which differed somewhat among the services. They were given objective examinations to determine

ability to learn. Classification procedures and the tests used were similar to those used for the men. In a similar manner, qualification cards were filled out and assignments made from them.

In the WAC, after the first group was chosen all but a few officers were obtained by selecting enlisted personnel for training at the officer-candidate school in Des Moines. Most WAVE officers were taken from civilian life and commissioned after two months of training. The major difference in requirements for officer and enlisted status was generally educational level or professional experience. Officers were assigned to duty or to additional training in a manner similar to that for male officers in the same service.

The Army-Navy College Qualifying Examination was used to ascertain the eligibility of civilian applicants for college training programs. Enlisted men in the Army, Navy, and Marine Corps were selected for training on the basis of recommendations by their commanding officers and of their scores on the general classification tests. Completion of specified subject-matter courses was also prescribed by both the Army and the Navy at one time or another for admission to college training programs. Specialized Training and Reassignment (STAR) units were set up in the Army to recruit, house, classify, and instruct personnel chosen by Field Selection Boards for specialized training. The Army Air Forces had its own college training detachments for men accepted for aircrew training.

LESSONS FOR CIVILIAN EDUCATION

1. Identify Exceptional and Specialized Talent

In peacetime the requirements for training citizens in the interests of the national welfare are all defined in the light of wartime military training. Freedom of the individual to choose his own activities and to plan a career for himself, in contrast to the compulsion arising from the exigencies of national defense, is a paramount consideration. Selection and classification of men and women in the armed services primarily on the bases of merit and the national welfare, however, suggest that, in a society becoming more democratic, systematic nation-wide pro-

cedures be developed for identifying men and women of exceptional and specialized talent. The implication is that a form of scholarship be provided.

The phrase "of exceptional and highly specialized talent" is used deliberately to describe the men and women for whom, it is believed, appropriate training should be provided. Information gathered in the armed services shows that for certain important occupations literary facility and verbal comprehension are *not* important. Highly specialized talent for designing or operating machinery may be largely unrelated to the presence or absence of verbal abilities.

The needs of the armed services were multitudinous and constantly changing, yet a conscientious and moderately successful effort was made to utilize selection and classification tests and procedures that would identify men and women of all the types of ability required to meet military needs. Selection procedures would include the use of tests of many unrelated mental abilities and motor skills, as well as instruments designed to reveal individual interests and traits of personality.

If the problem of selection is merely one of accepting or rejecting men and women for a highly specific course of training, simple short tests can be employed with satisfactory results. As the number of human abilities and skills required to be predicted is increased, the length and complexity of the selection tests must be increased to maintain efficiency of selection.

A study made by psychologists in the Office of the Air Surgeon illustrates to what degree it is possible to select men who will be successful. If applicants for aviation-cadet training had been accepted in the summer of 1943 without aptitude tests, it would have been necessary to start 397 men in pilot preflight school in order to obtain a hundred graduates of advanced pilot training school. Training facilities and personnel would have had to be provided for the unsuccessful three-fourths of the applicants until they were eliminated.

Applicants admitted to pilot preflight school in the summer of 1943 were required to obtain passing scores on the aptitude tests then in use (the Aviation Cadet Qualifying Examination and the Aircrew Classification Battery). As a result, to obtain

a hundred graduates of advanced pilot training school, it was necessary to start only 155 *selected* men in pilot preflight school. Since tens of thousands of men were being trained for duty as pilots, the saving in training facilities, instructional staff, and manpower achieved by the use of appropriate psychological tests in this one branch of the Army was tremendous.

To select and classify aviation cadets, a three-hour qualifying examination and an aircrew classification battery of tests that took about six hours were used. On the basis of these nine hours of testing, applicants were accepted or rejected and recommendations were made regarding their classification as pilots, bombardiers, or navigators. At least that much time would be required to provide needed information about the aptitudes of high school and college students. One of the clearest implications of the classification testing done in the Army and Navy is that more time should be spent in testing for purposes of differential selection and classification.

Tests of general intelligence or general learning ability have some value in educational or vocational guidance, but they do not often provide as efficient, or even as accurate, prediction of a stated criterion as a set of carefully selected specialized tests, the scores from which are weighted to yield optimum prediction of the criterion. The science of educational measurement has advanced far beyond the point where educators should be satisfied with the relative inefficiency of tests of general intelligence or general learning ability.

The Personnel Research Section of the Adjutant General's Office produced the Separation Reclassification Battery; the Test and Research Section of the Bureau of Naval Personnel validated their Basic Test Battery; and the Office of the Air Surgeon developed a variety of tests for the selection and classification of aviation cadets. Data from these tests suggest that for educational and vocational guidance a set of aptitude tests should be used, not to produce a series of comparable scores on the separate tests, but a set of composite scores in each of which every test is weighted according to its predictive value for success in a given course of study or vocation. Thus the same set of aptitude tests would yield information, depending upon the

respective weightings, concerning an individual's probable success in several fields.

In the Army Air Forces, a set of twenty aptitude tests in the Aircrew Classification Battery was employed to obtain several composite scores. They were used to predict performance in various specialties, such as assignments as fighter pilots, bomber pilots, navigators, and bombardiers, as well as to estimate in general a man's officer quality. Wide differences in the value of the tests were revealed. These data, together with the interrelationships of the tests themselves, provided the basis for combining the test scores into composite aptitude ratings. They also led to the formulation of hypotheses regarding additional types of mental skills that should be tested to improve the selection and classification process. Personnel in all of the armed services who were responsible for the selection and classification tests agree that the continual modification of selection and classification instruments based on validation data was the most important single aspect of the techniques employed during World War II in developing those instruments.

A wide variety of criteria was employed to study the validity of tests used in the armed services. Grades in specific training courses, graduation or elimination from training schools, ratings by fellow students and faculty members in training schools, and ratings by superior officers on performance in a certain duty assignment were commonly used in validation studies. Efforts to obtain combat validation data were made in the later days of the war.

Few criteria used in the armed services studies were sufficiently reliable to permit the validity coefficients to be high. The important implications for civilian educational practice are that ingenuity and care should be exercised to secure criteria that are realistic and truly important, and that when data are interpreted allowances be made for the unreliability of the test scores and criterion variables.

2. A Test of Fundamental Academic Aptitudes in Educational Guidance

Data pertaining to the use of aptitude tests among Navy

V-12 students at several universities show interesting trends regarding the prediction of school grades in various subject-matter courses by means of aptitude tests. A general implication for civilian education may be drawn from the data. It apparently is possible to predict degree of success in conventional subject-matter courses with sufficient accuracy to make the procedures of practical use in educational guidance.

A test of fundamental academic aptitudes can and should be developed in a systematic manner. It seems likely that items that measure mental skills, such as word knowledge, reasoning in reading, deductive reasoning, arithmetical reasoning, computational facility, perceptual accuracy, spatial visualization, and memory for meaningful material, might be useful for predicting school grades and achievement test scores in English, foreign languages, social studies, science, mathematics, shopwork, mechanical drawing, and clerical procedures.

Tests composed of the eight types of items listed, together with others suggested by pertinent research, should be administered to junior and senior high school students and validated against school grades and objective measures of achievement in several subject-matter fields. From the experimental battery of tests, a suitable examination for use in educational guidance might be derived. Extensive validation studies should be carried on over a period of several years and critical scores obtained for various types of courses in schools and colleges.

3. *A Test of Differential Aptitudes and Interests in Vocational Guidance*

A test battery for vocational guidance is a more ambitious project than preparation of a test of fundamental academic aptitudes. The number of mental and motor skills utilized in a wide range of occupations is probably far greater than that used in the common subject-matter fields. The Personnel Research Section of the Adjutant General's Office had assembled and published a Differential Aptitudes Test (Test SG-150a) for use in separation centers when the Army was demobilized.

To supplement information regarding vocational aptitudes, the test battery should include measures of vocational interests.

A prototype of useful measures of vocational interests is the Activity-Preference Blank constructed by Truman L. Kelley for the Adjutant General's Office. Another approach to the measurement of individual interests, which proved to have considerable merit, consists in determining individual interests by testing many pertinent aspects of general information. A person who knows a good deal about current literature and very little about recent sports events is likely to be very different from one who knows a great deal about recent sports events and very little about current literature. Unlike either of them would be the person who knows a great deal about both. The extent of an individual's knowledge or information about a wide variety of topics may be highly revealing so far as his interests are concerned. The results of using general-information items to predict graduation or elimination from advanced pilot training in the Army Air Forces were so satisfactory as to imply that this approach to the measurement of vocational interests should be more widely used than it has been.

In the Army Air Forces and in the Coast Guard, subjective evaluations of clinical data were made to supplement the data obtained from batteries of objective tests. At the Coast Guard Academy, the interviewer had the objective test scores of each man before him as he made his subjective evaluation during the interview. Hence, scores based on the interview were closely related to the weighted composite of the objective test scores. The addition of the interviewer's judgment to the objective test data added very little, however, to the multiple correlation between the test scores and the final level of achievement in the Coast Guard Academy.

In the Army Air Forces, various subjective evaluations of aviation cadets were made prior to their entrance to preflight school. In general, the results of their use were unpromising. No convincing evidence of their practical effectiveness for selecting individuals for pilot training was ever obtained. Occasionally, personnel officers or medical officers made exceptions to the current requirements for pilot training, but there is no evidence that men selected in this way succeeded in training more often than would have been expected on the basis of their test scores.

4. *Measurement of Separate Mental Abilities*

The results of testing hundreds of thousands of men in the armed services and of analyzing the data have suggested to many psychologists that the number of basic mental abilities may often have been underestimated. If it turns out that the number is greater than has been thought, the task of identifying and measuring these abilities will be formidable and will require separate tests designed to measure every important identifiable skill involved in the vocations and the school courses for which prediction of performance is desired, and to determine the individual tests that should be retained in a practical battery.

Much work already has been done to isolate basic mental abilities and basic personality traits and interests. Systematic efforts should now be made to coordinate research in the practical applications of tests of these fundamental abilities to vocational and educational guidance. The results of applying the available materials and techniques to the selection and classification of men and women in the armed services were gratifying. A similar coordination of effort would yield measuring instruments of considerable value to educational and vocational guidance.

5. *Regional Evaluation of Educational Outcomes*

The rapidity with which educational programs had to be set up in the armed forces, often under unfavorable circumstances, and the scarcity of trained personnel to act as instructors made necessary periodic evaluation of results. The progress of individual students in college training programs in many subjects was determined through objective tests. Comparisons of progress by entire classes were made. Officers in charge of training courses in the Army and the Navy said they considered the periodic use of tests of this kind helpful in achieving a uniform course of study in the various institutions and in locating where learning was not taking place.

Any attempt to evaluate teaching efficiency in civilian schools and colleges by means of examinations administered uniformly throughout a city, county, or state should be made with great caution and with limited objectives in view. It seems, however,

that the reasonable approach to the systematic measurement of minimum essentials would be on a state-wide or regional basis.

6. *Objective Tests and the Selection of Instructors*

Efforts were made in the armed services to select instructors by tests. The Army Air Forces had the problem of reassigning aircrews returned from the theaters of operation. To determine which men would be good instructors, efforts were made to develop tests that would correlate positively with grades in the central instructors' schools and with various criteria of teaching proficiency. In pilot and navigator training, correlations between the instructor-selection scores and various criteria of teaching proficiency were not significantly positive. The selection of bombardier instructors, on the other hand, seemed to have been more successful.

Development and validation of examinations to be used in selecting teachers for civilian schools should be encouraged. Examinations prepared for the National Committee on Teacher Examinations, under the auspices of the American Council on Education, have been used extensively throughout the country, and preliminary data regarding their validity have been published. Experience with test development in the armed services suggests that constant revision in the light of the best available validation data is desirable.

V. TRAINING ILLITERATES—THE ARMED SERVICES WAY

ACCORDING to the census of 1940, about 2,750,000 persons had had no schooling whatsoever; this represented 3.7 percent of the population of the United States. More than 7,333,000, or 9.8 percent, of the population had completed only the first four grades. Of approximately 29,000,000 youth between the ages of five through seventeen, representing 22.6 percent of the population, more than 25,000,000 were in public schools and approximately 2,666,000 in nonpublic schools. The remainder were in no school. In brief, this is the numerical story of America's illiteracy.

LITERACY TRAINING IN THE ARMY

Early in the vast mobilization program undertaken by the government, it was recognized that a manpower problem would exist in the country during the war. Having learned from experiences with regard to shortages during the World War I, the War Department made provision in the fall of 1940 for the organization of special training battalions at reception centers, which were to be organized only when directed by the War Department. Among the types of limited-service personnel to be received at these special training battalions were illiterates, non-English-speaking men, persons suffering from temporary physical defects at the time of induction, and men who, because of extremely low intelligence ratings or other indications, gave evidence of being inept. Authority was also granted to give selectees assigned to special training battalions "such specialized treatment and training" as would develop them for full field service or limited service. Schools for non-English-speaking men and illiterates were to be established as required.

Although the groundwork was laid early in the mobilization program for the reception and training of large numbers of handicapped men, no implementing directives to establish special training organizations were issued in 1940. Such directives were not issued for several reasons: First, the Selective Training

and Service Act of 1940, approved by the President on September 16, 1940, was a peacetime conscription law and real dangers had not up to this time beset the country. Consequently, the size of the manpower problem was not fully appreciated. Second, there was little realization of the extent of such special problems as illiteracy among the inductible population. Third, the prime job of the Army was to expand its facilities so that at least 800,000 men a year could be trained and assigned to the reserve at the end of each year. It did not appear feasible to burden the Army, already overtaxed, with the additional responsibility of training illiterates, non-English-speaking, and otherwise handicapped men.

Registrants called in the early days of the draft (November 1940) were therefore inducted into the military service if they were able to meet physical standards and "to understand simple orders given in the English language." The surprisingly high number of illiterates who found their way into the Army in the early months of mobilization soon brought about a modification of policy. On April 18, 1941, the following change to the original mobilization regulation was published. It was to become effective May 15, 1941.

No registrant in continental United States will be inducted into the military service *who does not have the capacity of reading and writing the English language as commonly prescribed for the fourth grade in grammar school. All registrants who have not completed the fourth grade in grammar school will be examined at induction stations prior to induction by means of tests to be prescribed by the War Department.*

Between October 1940 and May 15, 1941, 6,374 persons who could not read or write were inducted into the Army. Approximately 60,000 "so-called illiterates" were in the Army at the time it was stipulated that an inductee must have the equivalent of a fourth-grade education in order to be acceptable for induction.

The establishment of a fourth-grade standard was not considered a prohibitive requirement, for it was believed that schooling through the fourth grade was the minimum that a man needed in order to comprehend written instructions, orders, signboards, and regulations. Further, it was assumed that few per-

sons would be unable to meet this standard since education was so general throughout America.

The deferment of illiterates enabled the Army to explore various approaches to the problem. A War Department letter dated July 28, 1941, directed that a special training unit be established at each replacement training center. The units were organized to train those illiterate, non-English-speaking, and slow-learning men (Grade V personnel) who were already in the Army, and to determine experientially both their capacity to be trained and their usefulness in the service. At the same time, a number of cooperative efforts were initiated with civilian school systems, through the U. S. Office of Education and with Selective Service, to determine the practicability of raising the literacy level of illiterate Selective Service registrants prior to their induction call.

The deferment of illiterates continued until August 1, 1942. At that time it became necessary to make another revision in induction policy. As a result of the Japanese attack on Pearl Harbor on December 7, 1941, the country had become involved in the war as an active belligerent. Manpower needs became greater and it was no longer possible to overlook the 200,000 men in the nation, physically able and available for military service, who thus far had been deferred for illiteracy alone. Pressure came from many groups demanding the induction of illiterate personnel, because it was felt that in that way the induction of fathers and eighteen-year-olds might be delayed. Civilian education, though grappling with the problem of illiteracy and making strides in certain sections, had not been meeting the problem quickly enough. And, though the Army was not eager to undertake the task of educating illiterates in addition to training them for combat or noncombat service, the year's experience with illiterates in special training units had proved highly successful.

As a result of the foregoing factors and effective as of August 1, 1942, induction stations were authorized to accept for induction on any day illiterates in numbers not to exceed 10 percent of the white and 10 percent of the Negro registrants. Only those illiterates could be inducted who possessed "sufficient in-

telligence to absorb military training rapidly." Appropriate screening procedures were developed for application in the induction stations.

The policy of accepting illiterates to the extent of 10 percent of the white and colored registrants at each induction station on any day soon overtaxed the housing facilities available at replacement training centers. It became necessary in November 1942 to direct Army, corps, service command, division, or other unit commanders to establish special training units within their commands. In February 1943, when induction stations began processing selectees for both the Army and the Navy, and the Navy began to accept Negroes for service, the Army reduced from 10 to 5 percent the number of illiterate and non-English-speaking men who should be inducted in a given day. This policy continued in effect until June 1, 1943.

Several major changes in policy took place on June 1, 1943, all of which were planned to meet the changing war needs. The great need for additional manpower resulted in removing all limitations that governed the percentage of illiterates to be inducted. At the same time, to insure the induction of only better qualified illiterates, new screening and testing procedures were introduced at the induction stations and reception centers. To accommodate the greatly increased numbers of illiterate, non-English-speaking, and slow-learning men who were coming into the Army, commanding generals of the service commands were directed to organize special training units at or near reception centers. The organization of special training units at reception centers served two purposes: First, replacement training centers and organizations were relieved of the burden of training illiterates and could concentrate their energies and facilities on training literate trainees. Second, the illiterates were provided an opportunity to achieve literacy and other prebasic military skills before they entered the regular training cycle. Finally, it was stipulated and later explicitly emphasized by directive that special training units would train only illiterate, non-English-speaking, and slow-learning men, and would not serve as training stations for all low-grade personnel in the Army. The latter stipulation had the effect of abrogating an earlier provision con-

tained in paragraph 15, Army Regulation 615-28, "Classification, Reclassification, Assignment, and Reassignment," dated May 28, 1942, which specified that in addition to the previously noted three categories of personnel, special training units would receive "men emotionally unstable to a degree prohibiting their immediate success in regular training units" and "men who were physically limited."

Study of the strength and composition of the Army, soon after the new screening procedures were instituted, revealed that the Negroes represented approximately 9.2 percent of the entire Army. The percentage of the total strength of the Army to be represented by Negroes was set at 10.6, the percentage of Negro registrants under Selective Service in relation to the total registration. In order to meet the fixed quota, the acceptance score on one of the primary induction tests, the Visual Classification Test, was lowered from 40 to 36, effective November 1, 1943. To allow for the additional training needs of personnel who came in under the lower standards, commanding officers of units were authorized to keep for an additional four weeks beyond the twelve weeks previously specified any man who could in that extra time be qualified for regular training.

During 1944 new and improved test procedures were introduced in the induction stations effective June 1, but no new policies with regard to the selection of illiterate registrants were formulated. As the Army reached its peak in strength and as the emphasis was placed more and more on quality of personnel, policy changes were made within the Army affecting the training and assignment of illiterate personnel. For example, in August 1944 it was specified that only such personnel as could successfully complete basic training would be forwarded from the special training units, and that the emphasis would not be placed on accomplishment of academic standards alone. In November 1944 a directive was issued revoking the authority to extend the period of training beyond twelve weeks in exceptional cases.

In the younger draft group were many illiterates. A number of them came from families and communities in which pressure for educational accomplishment was not great; some failed to

take advantage of existing educational facilities; others found it necessary at an early age to assist with family chores or otherwise to seek gainful employment. Education of many of these youths suffered from the terrible hardships of the depression during the thirties.

Men in the special training units were often primitive in their social and emotional adaptations, those from rural communities more so than men from urban centers. Great numbers of them had never emancipated themselves from the immediate family unit. The absence-without-leave rate among special training unit personnel was greater than for personnel of any other unit.

LITERACY TRAINING IN THE NAVY

Prior to the middle of 1943 few illiterates came into the Navy because selection methods generally excluded them. No special program of training illiterates in basic literacy skills was set up in the Navy until January 1944, when one was launched at the Great Lakes Naval Training Station. Later, the special recruit training program (nonreaders) for all illiterate inductees other than Negro illiterates was moved from Great Lakes to Camp Peary, Virginia. During 1944 approximately 20,000 illiterates were brought to at least the fourth-grade level of learning and were transferred for general service in the Navy.

A study of more than 7,000 literacy trainees at Camp Peary showed that almost three-fourths of them were from rural sections. Ninety-five percent were from twenty-four states, chiefly rural and southern. One-third had attended one-room schools. More than half of the schools attended had outside toilets only; almost half were heated with stoves; one-fourth of the schools had no artificial lighting; and about one-fifth of them had only a water bucket for drinking purposes.

The average age of these Camp Peary illiterates was twenty-three, and almost a fourth were eighteen years of age. Three-fifths were married and had an average of two children. These trainees came from families which averaged seven children; half of their brothers and sisters had completed the sixth grade, but only one in thirteen of the brothers and sisters had completed high school.

Five percent of the trainees reported that they had not completed one grade in school; 16 percent, only one or two grades; 49 percent, six, seven, or eight grades; and seven men listed at least twelve grades of schooling, thus raising a grave question concerning the standards of the schools from which they came.

DEVELOPMENT OF LITERACY TRAINING MATERIALS

At the time the Army was confronted with the problem of training the vast number of illiterate inductees, there was a dearth of available instructional materials. The Camp Life Reader and Workbook series which had been prepared for enrollees in the Civilian Conservation Corps, textbooks prepared in conjunction with the National Citizenship Education Program, and the WPA adult reading materials were tried out, but none seemed to be appropriate as basic texts for this group.

Army Life was tentatively adopted for use by the Army in June 1941. By August 1942, it was replaced by *Soldier's Reader*. This dealt with basic military activities and was divided into four parts, corresponding to the reading levels of grades one through four. The following additional materials were prepared by the War Department to supplement the text:

DST-M1, *Manual for Teachers of Adult Elementary Students*.

Our War, a monthly news periodical which contained stories, feature articles, news accounts, and a cartoon strip at a third- and fourth-grade level.

Filmstrip 12-1, *Special Training in Reading, Writing, and Arithmetic*, a novel aid which provided drill on commonly used military words and simple arithmetic.

Other materials developed were a practice notebook, a placement test to determine the trainee's academic level, unit tests which covered parts of *Soldier's Reader*, an achievement test to find out if a man was ready for military training, and a testing manual.

In November 1942 two supplementary publications were prepared for special training units: *Your Job in the Army*, a pamphlet which contained descriptions of suitable Army jobs for

graduates of special training units, and *Newsmap Supplement*, a single sheet sent out weekly, giving trainees a simplified version of the material appearing in the Army's regular *Newsmap*.

Since the reader and its accompanying instructional materials did not reach desired standards, a new text and new supplementary materials were prepared. In May 1943 two new texts were ready—a reader and an arithmetic text, prepared by the War Department as technical manuals. The new Army reader, richly illustrated, stressed Army life and experiences, while the Army arithmetic taught most computations a soldier was likely to be called upon to make. Along with additional publications prepared in 1944 and 1945, they served as the major instructional materials with which most illiterates were trained. Among the supplementary materials were guides for instructors, suggestions for meeting the educational needs of men forwarded for special training, and a bulletin that described teaching aids and diagnostic and remedial procedures for classroom use. *Your Job in the Army* was revised, and the *Newsmap* special edition showed liberal use of pictures. *Our War* appeared monthly through September 1945 and was much enjoyed by members of the special training units.

Filmstrips were employed liberally. The titles in most cases indicate the subject matter: *A Soldier's General Orders*; *Military Discipline and Courtesy*; *How to Wear Your Uniform*; *The Story of Private Pete* (with a vocabulary of 46 basic words); *Introduction to Numbers*; *Introduction to Language—Nouns*; another film introduced verbs and prepositions; *The World*, which taught enough geography to help the trainee know what the armed services were doing.

A technical vocabulary to enable the trainee to defend himself against chemical warfare was prepared. Supplementary Reading Materials, containing stories of heroes, accounts of the allied nations, and other war stories, was distributed for several months.

All literacy training materials developed by the War Department were highly functional in character and intimately related to a man's Army experiences. The contents of all publications were checked against standard word lists and were analyzed

by statistical and other techniques to insure that they were properly graded according to level of difficulty. And, wherever possible, the material in the various fields—reading, writing, arithmetic—was correlated to help the instructor integrate his instruction.

Practically all of the special training units developed local materials to meet their own needs. Among the types of instructional materials prepared were: workbooks, drill exercises, flash cards, visual aids of various kinds, supplementary reading materials having academic and military subject matter, and instructor's guides.

EDUCATIONAL CHARACTERISTICS OF THE PROGRAM

The program of instruction was planned to accomplish five objectives: (1) to teach the men to read at a fourth-grade level in order to enable them to comprehend bulletins, written orders, directions, and basic Army publications; (2) to give the men sufficient language skill to enable them to use and understand such everyday language as is necessary to get along with officers and men in the Army; (3) to teach the men to do number work at a fourth-grade level to enable them to understand their pay accounts and deductions from them, laundry bills, and to conduct business in the post exchange; (4) to facilitate the adjustment of the men to military training and Army life; (5) to have the men understand in a general way the reasons that made it necessary for this country to fight the totalitarian powers.

Instruction in mental hygiene and in problems of personal adjustment was provided small groups, and it was possible to modify and adapt the program to suit individual capabilities, needs, and interests. Extensive use was made of illustration and demonstration.

No single method was recommended for the teaching of reading. Several different approaches were suggested, and selection was left to the discretion of the instructor. Primarily, it was recommended that the men be given a basic stock vocabulary by means of sight-recognition techniques and a multiple sensory

approach, and that rich associated meanings be developed in connection with words and phrases.

The use of exercises and flash cards containing first words, then phrases, and then sentences was recommended to increase the recognition span of the beginning reader. Word-blending and phonics in general were not precluded as effective procedures. Their use, however, was recommended more for third- and fourth-grade men than for beginners, and was further circumscribed to guard against their indiscriminate application.

Men were taught to read for detail, to follow directions, to derive meaning from paragraph material, to predict outcomes, and for ordinary enjoyment through extensive and varied reading instruction and exercises. Although the development of a fair rate of reading was one of the objectives of the reading program, the achievement of a fairly high degree of accuracy of comprehension was the major aim.

Written language exercises were always preceded by periods of oral expression. In this way, adequate opportunity was provided for the development of rich ideas and associations, unencumbered by limited spelling and handwriting skills. Written exercises were concerned chiefly with clarity of expression and not with accuracy of spelling or quality of handwriting. Men were taught to spell only those words which they were to use in writing. At times, because it was necessary to spend the greater part of the time available in teaching reading, inaccurate spelling was tolerated if a word was recognizable. And, while legibility of handwriting was sought, no great effort was made to obtain perfect alignment, letter formation, spacing, or great speed.

In arithmetic, emphasis was on whole numbers and fundamental processes. Section 3 of the Army reader was concerned almost entirely with number relationships and operations as they pertain to the life of the soldier. Both arithmetical computation and reasoning were involved in the solution of many of the situations provided.

In the academic phase of the program, men were classified on the basis of objective tests in reading. Inadequate reading

ability represented their greatest single limitation and accounted for their initial assignment to a special training unit. Major efforts in the program were therefore directed toward the eradication of this deficiency. No attempt was made to restrict the range of arithmetical ability in any single, homogeneous reading group. This did not offer any serious obstacle to the instruction provided in arithmetic. A majority of the illiterates were relatively proficient in number work.

Men progressed from one grade level to the next only after obtaining prescribed critical scores in unit reading tests. In military subjects, written and performance tests were used to determine the trainee's status, and in such subjects as Organization of the Army, Military Courtesy and Discipline, and Interior Guard, simple true-false and completion types of tests were used. For men on levels three and four, the tests were often written in very simple language. When men of the first two levels were tested, true-false questions were generally presented orally, and the trainee indicated the truth or falsity of the statement by punching an answer card. Tests in first aid, infantry drill, and manual of arms were of the performance type, and officers rated the efficiency of the soldier's actual performance.

Cumulative records which were maintained to show the status of each trainee's academic and military training were helpful in evaluating each man's rate of progress, in planning remedial programs for those whose progress was retarded or uneven, and in making a final estimate of a man's readiness for graduation.

PSYCHOLOGICAL CHARACTERISTICS OF THE PROGRAM

Emphasis on academic and military skills alone might readily have permitted the development of many feelings and attitudes that would have served only to inhibit effort and interfere with accomplishment. Emotional bewilderment by the new Army setting, and failure to understand the reasons for the war, could easily have frustrated a man's effort to attend to the immediate tasks at hand. Accordingly, the program of training made provision for subject matter that would facilitate the man's

social and emotional adjustment. Each man acquired a better understanding of the reasons that put this country into the war, of his role and responsibilities in the struggle, of the progress of the armed services, and of the problems concerned with occupation and the making of a peace.

Counseling programs were organized for each of the special training units. They were modeled after a similar program organized in one of the replacement training centers of the Ground Forces, and stimulated by a directive from the War Department. Noncommissioned officers were trained and assigned as counselors and worked under the supervision of the psychiatrist or unit personnel consultant. Men with simple problems were straightened out directly because their difficulties were discovered early. They soon learned that their problems were not individual, but typical of many other soldiers. Those men who experienced serious difficulty in adjusting were referred for a more comprehensive clinical study. In order to understand and improve the situation, use was made of appropriate tests, interviews, and treatment by professionally qualified personnel. When indicated, remedial programs were developed. When it became apparent that a trainee was inept, lacked the required degree of adaptability, or possessed undesirable habits or traits of character, he was recommended for separation from the service. Discharge was made by the commanding officer only after a board of officers concurred.

TEACHER SELECTION

Instructors for the special training units were selected from among those men in uniform who had either prior experience as teachers or an aptitude for teaching. Only those men were sought as instructors who had a sympathetic appreciation of the needs of illiterates, non-English-speaking, and slow-learning men, and could provide the encouragement and motivation necessary to make the program successful. In March 1944, a drive was made to recruit civilian teachers for the academic phase of the program in order to replace physically fit instructors who could be prepared for overseas shipment. Despite the teacher

shortage in the country, many units were given qualified civilian instructors.

ACCOMPLISHMENTS OF THE SPECIAL TRAINING PROGRAM

Of the 302,838 men who were received in special training units after June 1, 1943, 254,272 men successfully completed the program and were assigned for regular training. The number of men assigned represented 84 percent of those who entered the special training units which were operated at reception centers. Of those men who successfully completed the program, 79 percent required sixty days or less to achieve the prescribed standard.

There is no gainsaying the fact that in the Army many illiterate, non-English-speaking, and slow-learning men learned to read and to do number work at a fourth-grade level in a phenomenally short time. The marked success of this program has led certain uninformed individuals to make extravagant claims for Army training procedures. A more judicious evaluation of Army methods leads to the firm conviction that the Army developed no magical short cut to educational accomplishment. It was the persistent application of sound and fundamental principles of psychology and education that accounted for the Army's success in training illiterates, non-English-speaking, and slow-learning men. The following factors, it is believed, contributed to the success of the Army's literacy training program:

1. Careful selection of men for training
2. Clear definition of the objectives of the program
3. Development of specially appropriate materials and training aids
4. The all-inclusive nature of the curriculum, which sought to develop not only academic and military skills, but also included instruction in personal and social adjustment through mental hygiene sessions and orientation lectures
5. Establishment of standards of performance at each grade level
6. Teaching groups of small enough size to permit individualized instruction

7. Diversified methods of instruction, which included lectures, demonstrations, applicatory exercises, and the like

8. The differential rates of progress, which permitted each capable trainee sufficient time to reach set standards

9. Continuous study of the men to effect reclassification and reassignment when necessary

10. Careful selection of instructor and supervisory personnel

11. Provision for continuous in-service training of instructor personnel

12. Continuous appraisal of the results of training, through periodic inspections and the maintenance of an effective reporting system.

Two additional factors which were fundamental in the Army's literacy training program should not be overlooked. The first pertains to motivation of the men. Although a number of the enumerated factors undoubtedly served to stimulate the men to learn, they were extrinsic in nature. Learning to read and write provided each man with a means—often the only means—of communicating with his family. This was a powerful incentive and one which served intrinsically to stimulate the men. It was not uncommon to see men studying during the evening hours; writing letters under the tutelage of instructors; applying in other ways the skills they had acquired during the regular, more formal periods of instruction. In addition, for many of the men anxious to do their part in the war, making the grade in special training was a prerequisite to becoming a full-fledged soldier; and some, who did not understand too clearly their civic responsibilities, exerted effort because they did not wish to be stigmatized by being discharged and returned to their home communities so soon after induction.

The second consideration is the fact that the Army had these men twenty-four hours of the day. Each man was clothed, fed, and housed, and was provided with medical, recreational, and other facilities, as well as a planned and well-regulated day. The men did not have to travel far for their training or to accommodate many other needs. They were free to give all of their attention to the tasks at hand. In such a setting, it was not too difficult for men, selected because they had aptitude to

learn, to show accomplishment commensurate with their mental capacities.

Finally, the Army in its program had the advantage of three general conditions, the absence of which has impaired the effectiveness of civilian education many decades. First, the Army during the war had an almost unlimited budget, which made it possible to develop the finest instructional materials and to provide excellent facilities in many units. Second, it was possible to select out of an 8,000,000-man Army those instructors and supervisors who had most aptitude for the job and could perform most creditably. The question of salary did not enter. Third, because the training of illiterates was a new venture for the Army, it was not necessary for the Army to grapple with a traditional way of doing it or with a teaching staff unprepared or unwilling to modify its teaching techniques and procedures.

LESSONS FOR CIVILIAN EDUCATION

The program, procedures, and methods employed by the armed services in the training of illiterates contained several lessons for civilian education. Among them, the following are of major importance:

1. *Educating Adult Illiterates in Civilian Society*

A large part of the armed services program relating to the training of illiterates can be applied or adapted to comparable civilian adult education programs. It should be remembered, however, that the education of adult illiterates in a civilian society would be more difficult than it was in the Army or Navy. Even if the community provided ample funds, facilities, teaching personnel, instructional materials, and procedures, as was the case in the armed services, there would still remain the necessity of producing an incentive sufficiently dynamic to cause illiterates to want to learn. It might also be necessary to assist them economically and socially so that they might be able to attend classes.

Once adult illiterates are brought into a learning situation it will be possible to capitalize on the armed services' experience. Actually, any civilian approach to the problem of adult illiteracy should attempt to do more than the armed services did. It is

clear that of necessity the educational aims of the armed services were undertaken with limited objectives; the Army trained men to a fourth-grade level because at that level marginally useful men could be transferred to service. But more than a fourth-grade level of ability is necessary to function effectively as a voting citizen in the country and in the world of today.

In the Army, as soon as a man reached fourth-grade level he was assigned to regular training because he was needed in the stream of replacements. It is probable that a large amount of forgetting soon took place among the former illiterates. Any civilian undertaking, unhurried by pressure, should make adequate provision for proper retention of skill through over-learning. The armed services in wartime could provide a limited amount of follow-up work among the graduates of special training. Such work is important among men who have just acquired a literacy skill. They should be provided with continued stimulation for the exercise of that skill.

Large segments of the American people were educationally unprepared to do their part in the war. The armed services demonstrated that many of these people were educable and that education to the level of the fourth grade could be given them in a relatively short time. Now our national security requires that illiteracy be eliminated.

2. Common School Education Available to All

The primary implication of this study of illiteracy in the armed services is that the major method of eliminating illiteracy is to place elementary schools in the areas in this country where the children reside and where they are not now able to attend school for one reason or another.

Perhaps the fundamental thing to be learned from this special program of the armed services is not only a lesson for adult education but also the direct implication that illiteracy in a constitutional government based on democratic ideals ought never to be a problem were schools made available to children universally throughout this land. Another implication is that federal aid is needed for education as well as for the organization and structure of the program.

3. *Development of Interesting, Effective Teaching Materials and Tools of Learning*

The armed services demonstrated that the use of discarded school textbooks is not the way to produce effectiveness in the elimination of illiteracy in a period of from eight to twenty weeks. As previously indicated, a vocabulary devised around life in the Army and Navy, and the use of life situations, resulted in the production of materials of interest to the learner.

The imperatives, then, are: (1) the prompt placement of well-equipped literacy training facilities within immediate reach of every illiterate adult and making them so attractive and well known that all eligible persons will voluntarily take advantage of them, and (2) the placement of school facilities within easy access of every child capable of literacy; extension and improvement of the administration of school attendance, including the school census, investigation and remedy of causes of nonattendance, revamping, and thoroughgoing and intelligent enforcement of state school attendance laws; placing a "floor" under the quality of elementary instruction in every locality, so that attainment of at least fourth-grade standard will be universal.

Money, equipment, teachers, and expert supervision and administration are required.

VI. THE HEALTH AND PHYSICAL FITNESS OF A NATION

PHYSICAL examination of millions of men by the national Selective Service System and the large-scale activities of the armed services in medical care, physical training, and recreation provide a wealth of facts which point to the need for important advances in civilian education and community planning. Almost 5,000,000 men were found physically unfit for admission to the armed services. This simply means that they were unable to pass medical examination for admission to the service; it has no relationship to the physical fitness of youth upon entering the service. While these figures may be variously interpreted, the fact remains that the health and physical fitness of the nation's youth constitute a first prerequisite to national security.

Physical fitness of personnel is a traditional policy in the Army and Navy and their respective branches. It was recognized during World War I, and special consideration was given to programs of physical fitness, recreation, and athletics for military and naval personnel prior to the days of mobilization for World War II. Recognition that modern war demands the acme of physical fitness and that a substantial proportion of American men were not physically fit resulted in plans for more emphasis in this area than ever was given previously by the Army and Navy. Unofficial consultations were held with civilian specialists in physical education, athletics, and recreation; directives were issued; pamphlets were published and programs more definitely planned in 1940 and 1941.

By the spring of 1942, well-known professionally trained specialists were selected as civilian consultants or as administrators, supervisors, and instructors for the health and physical education programs of the armed services. They aided in the selection of the personnel who were to conduct the programs. The training schools for specialized services were opened in July 1941. Other schools were established as late as August 1945. Most of the service programs continued throughout the war without modification but were continuously expanded.

THE TEST OF HEALTH EDUCATION
AND HEALTH SERVICE

To those who were in charge of the health education and health service programs the war experience indicated unmistakably a number of specific avenues along which progress should be made in order to raise and maintain the level of national health above that which prevailed prior to the war.

The statistics of rejection for the armed services for selected ages were as follows:

Age	Percentage of Rejection
20	25.5
25	37.0
30	43.5
35	52.0
40	54.4
45	66.3

These data indicate that the number of rejections from military or naval service increased rapidly with age. For example, the percentage of rejections at the age of forty was twice as great as that at the age of twenty.

The records show that men were not rejected for the armed services for poor physical fitness primarily, but because of disqualifying physical, mental, or emotional defects and diseases (see Table I). The increase of disqualification as age increases therefore is not due simply to increasing physical inactivity with the resultant lack of physical fitness but more particularly because of diseases and defects which were preventable. There were several means of prevention that might have been used. The three following general categories warrant special consideration:

1. Safety education. Defects listed under musculoskeletal disorders by the Selective Service System include those resulting from accidents. Some of these accidents were preventable. Schools and industry, particularly, gave courses in safety education before the war. Yet accidents occurred. Some of these probably were due to lack of skill, but many of them probably were due to lack of effective programs of safety education as given by appropriate individuals, organizations, and agencies, or by programs that should have been given.

2. Individual hygiene regimen. Some disqualifying defects were due directly or indirectly to malnutrition, to diseases resulting from careless personal hygiene, and neglecting known defects

TABLE 1
CAUSES OF SELECTIVE SERVICE REJECTIONS AND ESTIMATED PREVENTABILITY

Defects and Diseases	Percentage of Rejections	Estimated Possible Improvement within 20 Years under Ideal Conditions (on a scale of 100)
Mental disease	12.5	1.5
Syphilis	9.4	90.0
Musculoskeletal disorders	9.3	15.0
Cardiovascular defects	8.8	44.0
Hernia	7.8	90.0
Eyes	7.8	8.3
Educational deficiencies	7.7	70.0
Neurological defects	5.5	6.0
Ears	5.0	55.0
Tuberculosis	3.7	50.0
Mental deficiency	3.0	.....
Weight and height deviations	2.3	48.0
Lungs (other than tuberculosis)	2.2	
Teeth	2.1	80.0
Abdominal viscera.	1.7	
Genitalia	1.4	6.0
Kidney and urinary diseases	1.3	9.5
Varicose veins	1.3	80.0
Endocrine disturbances	1.3	.....
Feet.	1.1	75.0
Gonorrhea . . . . .	.9	100.0
Nose. . . . .	.7	25.0
Skin. . . . .	.7	5.0
Nonmedical defects. . . . .	.7	
Neoplasms. . . . .	.6	63.0
Piles. . . . .	.5	90.0
Mouth and gums. . . . .	.4	90.0
Throat. . . . .	.1	32.0
Blood and blood-forming diseases . . . . .	.1	
Infections and parasitic diseases . . . . .	.1	75.0
Total	100.0	

until they became serious. Prevention in such cases includes effective health education.

3. Improvement of medical service. Many defects reported in the rejection statistics were of the type that cannot be prevented. Others were of the type that can be prevented only when

medical service is excellent. Under as ideal conditions of medical service and health education as might reasonably be hoped for in the next twenty years, a reduction of approximately 41 percent in the rejection figures might have been possible.

A study of the causes for rejection reveals (1) that many of the causes do not disqualify the individual for customary civilian life and (2) that many causes for rejection are not remediable with present methods. Examples of the first observation are: many individuals have neuroses; many persons have amputated limbs; other musculoskeletal disorders are not uncommon; many persons have heart diseases, hernia, nearsightedness, deafness which can be remedied by instruments; there are many who are over- or underweight; many with dentures which were not acceptable by the armed services; some have deformed genitalia, varicose veins, pronated feet, noses with obstructions, benign tumors, or hemorrhoids. Persons with one or several of these ailments may function quite satisfactorily in many civilian situations. As for the second fact revealed, it is known that many psychopathic personalities cannot be helped with present treatment. It is also known that acuity of vision varies from extreme nearsightedness to extreme farsightedness and that, in general, there are other hereditary tendencies toward varicose veins, kidney or heart diseases, hypertension, and endocrine disturbances; and many ear difficulties are also traceable to heredity. Hence, among the approximately 59 percent not subject to remedy, there are many which are not any present agency's responsibility. Of the group that might be remedied, quite a number of the causes of rejection could be prevented if all Americans were adequately nourished.

Judging from the emphasis placed by the armed services at training centers and in training manuals on instruction in such ordinary rules of health as cleanliness and eating, most servicemen were assumed by the armed services to lack even a minimum of knowledge about healthful living. The Navy alone produced thirty-five films on common health topics and first-aid treatment. Experience with servicemen indicated that this assumption was correct as it applied to the vast majority.

Health education for students in schools and colleges is only

part of education's responsibility, if educational authorities are to be of such assistance as reasonably may be expected of them. For example, only 50 percent of parents who are informed that their children have remediable defects take any action to have their children treated. A great many of the rejectees did not know of the existence of their defects until informed of them by the Selective Service Board.

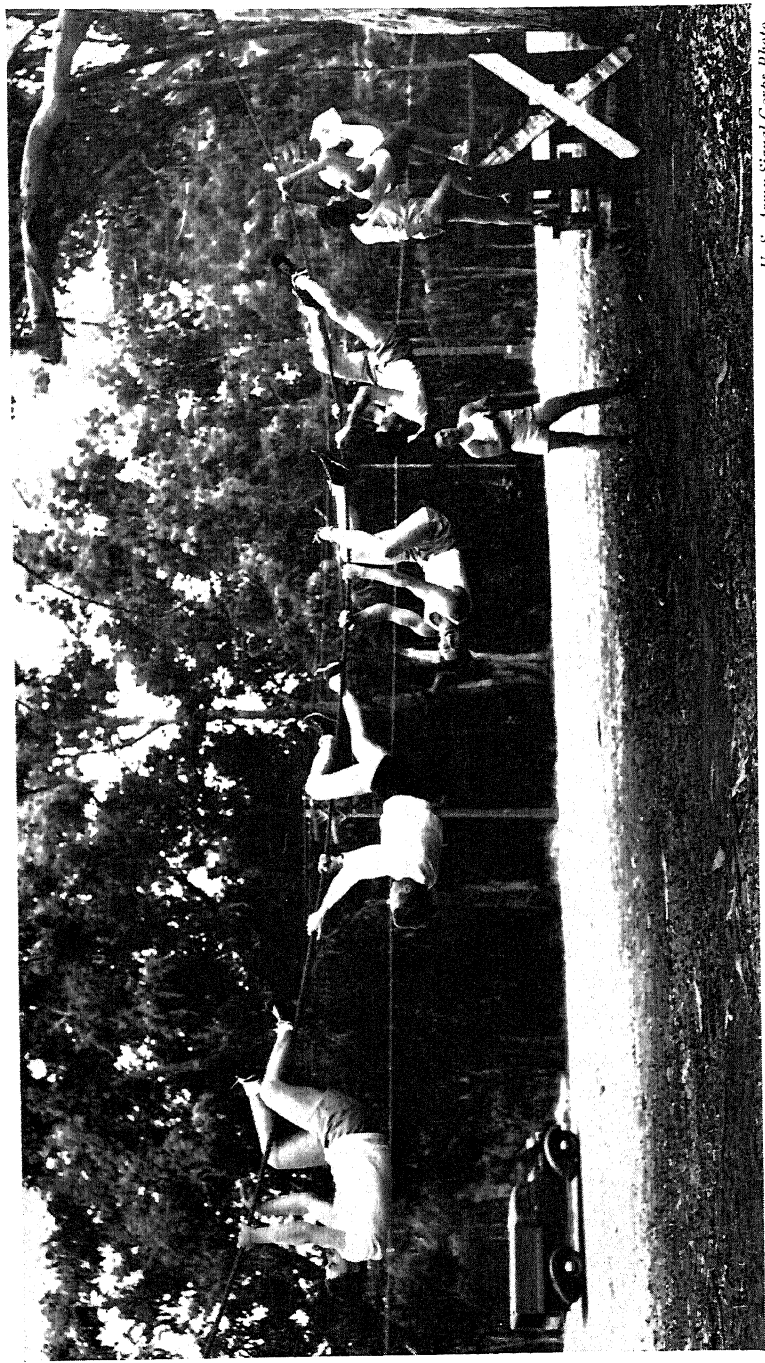
The rejection statistics do not give a complete picture of the need for action in improving medical services and health education. The armed services accepted many thousands of men with remediable defects and corrected these defects after induction. For example, in 1942 and 1943 the Army treated 14,600,000 cases (53,000,000 "sittings") for dental defects alone. In addition, many of those rejected for causes other than mental deficiencies and neurological disorders would have been qualified for military or naval service if they had had their remediable defects corrected early enough. Furthermore, millions of men with physical defects were accepted by the Selective Service Boards.

PHYSICAL FITNESS

In a standard test of endurance, 67 percent of newly inducted soldiers failed to pass *minimum* requirements. In a standard test of strength of torso, the percentage was 56.5; in a standard test of agility, 76.5; and in a standard test of speed, 47 percent of newly inducted soldiers failed to pass minimum requirements. In a different but highly correlated standard test of endurance, 52 percent of the newly inducted soldiers and 52 percent of aircrew trainees from seven widely scattered Army Air Forces basic training centers received ratings of "poor" or "very poor." The percentages of incoming servicemen unable to swim were: Army and Navy, 20 to 50 percent whites, 50 to 80 percent Negroes; incoming Reserve officers, 20 to 30 percent; college training program trainees, 15 to 30 percent; Army Air Forces personnel, 20 to 30 percent.

When the vast majority of men came into the armed services they lacked the endurance to walk long distances (*without* packs), or run half a mile, or perform heavy physical work through-

PLATE I



U. S. Army Signal Corps Photo

A PHYSICAL EDUCATION EXERCISE IN AN ARMY TRAINING UNIT AT A UNIVERSITY

out a day, without becoming excessively fatigued or quitting before the assignment was completed. Most new men in the service lacked the muscular strength to lift or carry reasonably heavy objects, "pull their weight"; thousands of them could not "chin themselves" once. Most incoming servicemen showed marked inability in such basic skills as falling, throwing, jumping, crawling, pushing, carrying, pulling, pivoting, dodging, and lifting.

In the initial tests of physical fitness a progressive regression of scores according to age was noted. This prompted Col. Leonard G. Rowntree of the Selective Service System to remark:

I think a lot of harm has been done by the statement that a man over forty should not exercise at all. Much of the work that is being done today in the Army and Navy and in civilian life is being done by older men who have kept themselves in good physical shape. If men stop exercising after forty, a good deal of the world's work will not be done. . . . The ordinary "hit and miss" program [of exercise] can do as much harm as good.

Effect of Armed Services Physical Training

In one study at eleven Army camps where only military drill and tactical training (no physical training) were given, 60 to 70 percent of the men concluded basic training in "poor" physical condition.

In the Army college training program, trainees improved from fourteen to sixteen points (25 to 36 percent) during a twelve-week period in physical fitness. Men at the Army Air Forces basic training centers improved their physical fitness rating 40 percent.

At naval recruit training centers, men improved their physical fitness scores 14 percent in four weeks, 27 percent in eight weeks, 38 percent in ten weeks. An additional four weeks of physical training raised the physical fitness scores an additional 6 percent. Navy V-12 trainees improved their physical fitness scores 31 percent during the first fifteen weeks.

The percentage of nonswimmers among naval recruits was reduced to 2 to 3 percent (whites) and to 50 percent (Negroes) by the end of the recruit training period. Nonswimmers in the Army Air Forces were reduced to 5 to 9 percent. Passing the swimming test was a requirement in naval aviation and in the

Marine Corps, although some among the first men to go overseas and a few later on continued to be unable to swim.

Although over half of recruits and trainees displayed marked timidity and hesitancy in physical activities requiring "physical" courage and aggressiveness, almost all of them improved and most of them apparently overcame these types of fear. This improvement included pushing the "psychological" limit toward the physiological limit in acts demanding endurance, strength, and skill. Improvement in physical fitness (including swimming ability, skills, and "physical" courage and aggressiveness) varied directly with the vigorousness of the programs, the effectiveness of the leadership, the provision of adequate time, and gearing the programs to the objectives. For example, at institutions offering college training programs where all of these conditions were not met, physical fitness of trainees averaged as much as twenty T-scores below those institutions where these conditions were met. In an AAF study of 95 percent of its Zone of Interior pilot personnel, it was found that only 23 percent could reach a physical fitness rating of sixty-six (the standard for pilot personnel) but after one year of physical training, 92 percent reached or exceeded this standard.

Attitudes toward Physical Fitness

In an Army survey over 4,000 men representing three combat divisions were asked if they would like their outfit better or worse if more physical training and physical hardening exercises were given. An average of 46 percent voted "better," 14 percent voted "worse," 40 percent voted "same." Another Army attitude survey revealed that 55 percent of several divisions voted that they wanted "more physical fitness activities" during training periods. Forty-three percent of combat infantry officers voted that "lack of endurance due to poor physical condition" was "rather bad" or "very bad" as an obstacle to battle success.

With the exception of athletes and former athletes, almost all recruits and new trainees had negative attitudes toward the physical training programs. Before completing their training most of them reacted as follows: "This is the first time in my life I've really felt good." Or, "Now that I know what it feels

like to be in good shape I don't want to slip back again." Or, "Why didn't somebody force me to get into really good shape before?"

OBJECTIVES AND CONTENT OF PHYSICAL TRAINING PROGRAMS

One of the significant features of the physical training programs was a clear understanding of their purposes on the part of personnel. The following purposes of the armed services physical training programs have been gathered from the various statements: (1) to develop and maintain enough muscular strength to handle the heaviest routine and emergency tasks, (2) to develop heart-lung endurance for prolonged exertion, (3) to develop speed, agility, and suppleness of body, (4) to develop basic skills, such as swimming, jumping, climbing, vaulting, and running, (5) to develop confidence, aggressiveness, and resourcefulness, (6) to develop physical toughness, (7) to develop teamwork and the will to win, (8) to develop unit solidarity, (9) to develop the ability to think and act quickly and properly under pressure, (10) to serve as recreation, if it could be accomplished without sacrificing physical fitness.

The missions to be performed by men in the different service branches, the difference in length of training periods, and the type and extent of professional preparation of instructional personnel made modifications in the physical training programs necessary. On the other hand, certain factors served to make fundamental similarities. Military drill was not a substitute for physical training. The typical physical training program of the armed services consisted of these major divisions: swimming, physical conditioning activities, athletics, combative or self-defense activities, and posture training. Certain service branches included drill in weapon handling in their physical training programs.

Well-illustrated and -organized manuals on physical training were published. An excellent series of twelve textbooks on various phases of its program was used by naval aviation.

During training periods, at least five and sometimes six hours

a week were allotted to physical training—either one hour a day, or two hours a day, three days a week. As a rule, time for dressing, bathing, and passing to classes was included. Six hours a week were required throughout the successive stages of pilot training. During operational training this amount was reduced to three hours a week. At the end of four months of operational training, the physical fitness of pilots decreased from 20 to 30 percent.

Hundreds of suggestions were given to instructors regarding such matters as the following in conducting their respective programs: the relationship and importance of physical fitness to the missions to be performed later (also discussed with men during physical training classes); "warming up" and "cooling off" before and after vigorous exercise; adapting the program to local conditions; care of gear and uniforms; visual aids; time-saving techniques; methods of conducting tournaments; safety; teaching techniques; and use of civilian facilities. These and similar suggestions were in general practice wherever well-organized programs were in operation.

The Instructors

Wartime graduates from the Navy's Physical Instructor's School totaled 12,352. Of these, 2,648 were commissioned officers, the majority of whom had served as noncommissioned physical training instructors. In the naval aviation program, 2,100 physical training officers were prepared and assigned to this type of duty. In the Marine Corps, 470 officers were trained to conduct programs of athletics, physical training, and recreation. The instructional staff of the Army Air Forces physical training program numbered over 3,000.

Many of these instructors, supervisors, and administrators had formerly been teachers and directors of physical education or athletic coaches or directors in schools and colleges. A substantial number of them had graduate degrees in physical education. On the other hand, during the latter part of the war it was necessary to select men most of whom were without professional backgrounds in physical education. The chief criterion in the selection of these untrained men was *leadership ability*.

It is noteworthy that many of these men rapidly developed into excellent instructors of physical training.

Motivation

Although the desire for survival and the desire to serve one's country effectively were basic appeals for the average recruit and trainee to become physically fit, these incentives varied in their effectiveness among individuals and with the length of the training period. Instructors found it necessary constantly to motivate most men in physical training classes. Competition, use of athletic sports, obvious interest of commanding officers, effective leadership, use of test results, awards, challenging the individual to better performance, and the use of "class leaders" were some of the effective methods of motivation used.

Testing

The physical fitness tests used by the armed services accomplished several things: (1) They helped motivate men to develop and maintain good physical condition. (2) They helped to show those in command the need of a physical training program and its results. (3) They aided instructors in planning and revising program content and emphases. (4) They yielded data, useful now, revealing the physical condition of American youth and men at the time of induction and showed the degree of improvement that resulted from organized required programs of physical training. (5) They were useful in informing men of their physical fitness status—an item in morale and self-confidence.

Several practical restrictions limited tests and testing in the armed services: (1) It was necessary to have an absolute minimum of equipment. (2) The test had to be capable of being administered to large numbers of men in a short time. (3) The successful taking of the test could not be too dependent on previously learned special skills. (4) The scores had to be conducive to rapid statistical treatment. (5) The test had to be as short as possible, measuring only those measurable aspects of physical fitness judged as absolutely essential. Judging the performances of men in some of the events of the various tests

was too dependent upon human frailty to meet the strict criterion of objectivity and reliability.

Facilities and Equipment

Facilities for physical training such as pools, gymnasiums, and fields were adequate at most training units if the classes were distributed throughout the day. In the college training programs, most of the institutions provided adequate facilities for at least the major portion of the physical training programs, although considerable substitution and improvisation were necessary. A few colleges and universities possessed fully adequate facilities for physical training.

Physical training equipment at all continental training units was adequate. The funds allotted for this purpose varied from \$2 to \$8 per man a year. The exact allocation of funds for equipment for physical training is undeterminable. Equipment for recreational athletics also was used in physical training classes and vice versa.

ATHLETICS AND RECREATION IN THE ARMED SERVICES

Most of the millions of incoming men who were unfamiliar with sports as participants possessed negative attitudes toward learning to play and had difficulty in learning. Once a man's physical fitness level was high enough and he had learned a few skills, he became interested enough to participate voluntarily.

About 80 percent of Army personnel participated in athletic competition before discharge or redeployment. In the naval aviation program, during preflight training, almost all men participated considerably in eighteen different sports. Hundreds of "varsity" teams representing all of the services competed whenever conditions and circumstances permitted. In addition, thousands of "intramural" contests were held.

Before being released from Navy hospitals and Army convalescent centers, patients who did not have seriously handicapping defects participated from two to six hours a day in athletic sports. Some men with serious defects played in several sports. Millions of servicemen learned for the first time a certain amount of athletic skill, teamwork, and also acquired socio-

emotional qualities related to competition in sports. For the first time in their lives, many servicemen experienced the provision of adequate equipment, facilities, leadership, and opportunity for learning.

During the rapid growth of the Army in 1940, morale problems arose because of a lack of recreational facilities. More adequate facilities, equipment, and leadership were procured. The Navy and Marine Corps made similar practical provisions.

A conference of War Department representatives and civilians was held August 14-19, 1944, to plan for "the readjustment of personnel after the defeat of Germany." This group wrote a program most of which related directly to maintaining morale and physical fitness through athletics and recreation.

About 10,000 leaders were trained; \$30,000,000 was spent for equipment; facilities were developed or rented; and a competitive athletic program of fifteen sports was organized for the Army redeployment and discharge period. About a hundred civilian specialists were transported to advanced areas to train the 10,000 leaders who were to have charge of the programs.

The Navy's recreation program functioned throughout the war. By September 1942 about 150 recreational officers had been secured, and by the close of the war this number had been increased to 450, of whom 300 served in the fleet or at advanced bases. In addition, commanding officers of ships and advanced bases assigned 300 officers to recreation duty. Several thousand enlisted men who were specialists in an athletic or recreational activity assisted in conducting the Navy's program.

Some idea of the amount of money that was spent for recreation by the Navy can be got from the fact that in April 1945 a twenty-month program was planned calling for an expenditure of \$22,000,000 for equipment alone.

Recreation held high priority in the Marine Corps. At advanced bases, as soon as conditions permitted, facilities were brought in or improvised. About \$3 per man a year was spent for recreation equipment. Four hundred and seventy officers were trained to handle athletics and other forms of recreation; other officers also were assigned this type of work as additional duty.

The common practice in all the services was to provide recre-

ation every day during off-duty hours when conditions permitted. A typical program had the following categories of recreation: athletic games and sports suitable to local conditions; traveling shows and musical units; self-entertainment of several types; motion pictures; radio hours; outings; local newsheets or papers. Activities related to the organized recreation program included the post exchange or ship's service, educational services, and clubrooms. Many civilians, civilian groups, and organizations contributed much to the welfare and recreation of servicemen.

Some studies were made of preferences in recreation. One Army group stated its choices in the following order: (1) motion pictures, (2) plays, (3) hobbies. According to one Army study, one man in seven participated in sports during off-duty hours. The sports preferences of these men were: (1) baseball or softball, (2) football, (3) basketball, (4) swimming, and (5) boxing. Six percent of this group preferred other indoor sports besides those mentioned, and 16 percent preferred other outdoor sports (unspecified).

School, college, municipal, county, and state recreational facilities were provided free to servicemen. Such organizations as the YMCA and the USO made their facilities available at all possible hours at no cost to servicemen or to the armed services. With the exception of commercial forms of recreation and entertainment, many communities lacked facilities for any appreciable number of servicemen.

The Army Special Services School, Lexington, Virginia, prepared both Army and Navy recreational and athletic leaders. The civilians who spearheaded the Army's redeployment athletic program also received training at this school.

LESSONS FOR CIVILIAN EDUCATION

1. *Coordination of Agencies*

The tendency to assign to schools and colleges the total responsibility for the relatively poor physical state of potential military and naval personnel overlooks the fact that health and physical fitness involve far more than the programs provided in these institutions. The absence of coordinated programs involving

all governmental and voluntary agencies at the community level, the economic inability of many to finance a proper health program, parental delay, individual irresponsibility, and lack of medical facilities perhaps, all contributed to the poor physical state of the millions who were registered by Selective Service action.

2. Re-evaluation of Programs

The use of Selective Service data to promote the interests of special groups or the assumption that armed services physical training programs as such are valid without modification for schools and colleges would be unfortunate, not only because of the essentially different objectives, but more particularly because a balanced program of health education and service is needed.

The rejection of several million youths and adults because of physical defects, at least at the time of the examination, inevitably should result in the re-examination and re-evaluation of present programs and practices in schools and colleges. The present practice, in some instances, of recognizing "credit" for the armed services physical fitness courses, thereby exempting the individual from further requirements in school or college, or the extension of present programs from two to four years in other cases, appears to ignore the state of the individual and his particular needs.

There is need for an improved institutional environment and for healthful educational procedures with emphasis on the principles of mental hygiene. There is need for effective health instruction for all students and for measures to prevent and correct defects so far as this is possible.

Efforts toward the improvement of physical education in schools and colleges should be undertaken with special reference to emphasis on physical fitness, including swimming, making wiser and better use of tests, providing more adequate programs for all persons, and more effective instruction.

The facts relating to health and physical fitness, as revealed by World War II, are startling but not new. The great need, as previously indicated, is to set forth the specific objectives for the program within our institutions and then to set up the ma-

chinery necessary to attain those goals. The coordination of community health agencies has been recommended in many studies. The primary need is to place in action the policies and programs and procedures which already are known to educational leadership.

VII. MAKING THE BEST OF TEMPORARY AND PERMANENT HANDICAPS

PRIOR TO the onset of World War II, the U. S. Public Health Service estimated that there were approximately 23,000,000 persons in this nation who were handicapped as a result of disease, accident, maladjustment, or former wars. Accidents alone, according to the National Safety Council, increase this number yearly by 350,000.

During the period from Pearl Harbor to VJ Day there were approximately 17,000 amputations in the Army, but during this same period there were over 120,000 major amputations as the result of disease and accidents among our civilian population. During the first ten days after D Day 11,000 American soldiers were wounded on the beaches of Normandy, but even with traffic curtailed because of gasoline rationing this country suffered more than twice as many civilian casualties in the same ten days as a result of automobile accidents. During the war 260,000 servicemen were permanently disabled by combat wounds, but during the same period 1,250,000 civilians suffered permanent disabilities from accidents.

To the men disabled in service, the armed services and the Veterans Administration are bringing many new opportunities, but the forty-three out of every one hundred men who were unable to pass Selective Service medical tests are denied these opportunities. Also, little is being done for the 2,000,000 persons in this country whose correctible physical defects prevent them from holding jobs. In fact, there are too few programs for the 350,000 persons who are disabled each year from accidents.

THE ARMED SERVICES PROGRAM

Time was of the essence during the dark and uncertain days of early 1942, for manpower shortages existed in the armed services as well as in civilian production. Training camps and technical schools frequently operated on a twenty-four-hour-a-day, seven-day-a-week schedule. It was necessary during that critical period for every man to pull his share of the load. Not-

withstanding this tremendous pressure on manpower, thousands of patients in military hospitals sat waiting for time and nature to complete their convalescence. Their definitive medical care had been completed and they now had nothing to do but to sit and wait. That waiting turned into long periods of boredom as they read comic books, played pinochle, and did nothing to aid either themselves or the mission of the armed services. They waited and they often waited for a long time.

In military service a man is either "sick in hospital" or on active duty; there is no in-between period as there is in civilian life, when a man is told by his doctor, "Go home and take it easy for a few days and come back to see me next Tuesday." Full duty is arduous duty in preparation for combat, and before the military patient can be discharged from the hospital, he must be physically ready for long and strenuous hours of activity.

It was to convert this hitherto wasted time into useful, purposeful activity that in December 1942 the Army Air Forces initiated the AAF convalescent training program in all its hospitals. Forerunner of the subsequent reconditioning programs of the Army Service Forces and the rehabilitation programs of the Navy, the convalescent training program had a dual mission: first, to send the soldier-patient back to duty in the best possible physical condition in the shortest possible time; second, to teach the soldier-patient while he was convalescing something that would make him a more efficient and effective fighting man.

The need and value of the physical reconditioning phase of these programs can easily be understood. Physical condition and length of hospitalization usually vary inversely; that is, the longer a patient remains hospitalized, the poorer his over-all physical condition becomes. It was the usual procedure, prior to the introduction of physical reconditioning, to have a patient leave the hospital in worse physical condition than when he entered. Under the rehabilitation programs, however, physical reconditioning became as much a doctor's prescription as drugs and diet. Muscles were not permitted to atrophy, for light general reconditioning exercises were started the moment an acute illness or surgery terminated.

Early in the program it was noted that to obtain maximum

results, reconditioning not only had to start early, but it had to be purposeful and progressive with a gradual increase in the patient's activity as his physical tolerance increased. Special corrective exercises were designed to meet military needs and experienced physical training instructors were assigned to administer them. As functional aids to recovery, ward fatigue and detail work were correlated with the patient's disability. Men with hand, finger, and wrist injuries were given duties that involved finger and hand manipulation, while those with back or knee injuries were given duties which aided in their recovery by strengthening the affected parts.

Special remedial exercises correlated with physical therapy treatments were given to men with orthopedic disabilities. In order to provide sufficient trained and experienced personnel to administer corrective physical rehabilitation, special courses of instruction were established where experienced physical education specialists were given short, intensive courses in disability evaluation, kinesiology, anatomy, corrective exercise, adapted sports, muscle testing, muscle re-education, and techniques in the functional use of prosthetic devices. Hundreds of men attended such courses given by the Army at Lexington, Virginia; Camp Grant, Illinois; and Fort Lewis, Washington; by the Navy at Hunter College, New York City, and Sampson, New York; and by the Army Air Forces at Miami Beach, Florida; Mitchell Field, New York; and the Institute for the Crippled and Disabled, New York City. Working in close cooperation with physical therapists in well over a thousand military and naval hospitals, they made physical exercise and activity an integral part of medical treatment.

THE PATIENT AS AN ACTIVE CONVALESCENT

In conducting the corrective physical rehabilitation program emphasis was placed on motivation. The patient was told in nontechnical terms the extent of his disability, the types of activity which would help to correct his disability, and the physiological and anatomical reasons for the activities prescribed. The patient was made to feel that he was a member of the rehabilitation team and that his success in overcoming his physi-

cal disability was largely dependent upon the effort which he himself put into the prescribed activities.

A number of publications dealing with the purposes of the program were prepared. Some were general orientation booklets, such as the Navy's *Plotting Your Course*, the Army's *New Horizons*, and the Army Air Forces' *You Are Convalescing*. Particularly interesting was the *Handbook of Recovery*, a prescription booklet for all types of orthopedic disabilities, published by the AAF. At the end of the book was a personal recovery chart to be kept by the patient. On it he was to record in objective terms his increased range of motion and strength. *Let's Walk*, another AAF manual, began with an analysis of the important muscle groups used in walking with crutches. Through the use of pictures, emphasis was placed on balance, posture, techniques for walking with aids, crutch gaits, and exercises in preparation for prostheses.

Supplementing the publications were a number of specially prepared orientation films which explained the programs to the patient and showed him what lay ahead. Such films included *Reconditioning Convalescents for Return to Duty*, *The Voyage to Recovery*, *Out of Bed—Into Action*, and *The Road to Recovery*.

Classwork, as well as individual instruction, was given in such subjects as military and naval administration, clerical training, supply, teletype operation and repair, radio code, graphic arts, navigation, mechanics, gunnery, automotive repair, instrument repair, machine-shop practice, photography, radio operation and repair, sheet-metal work, welding, and woodworking. Practical experience was provided by on-the-job training in many of these subjects. Industrial therapy was started whereby patients, while still hospitalized, spent a part of each day doing piecework and subassembly for an industrial plant which paid them for the work.

Special classes were organized for the purpose of teaching basic educational skills to men who were educationally retarded, as well as to give instruction in higher mathematics and physics to patients scheduled to attend specialized schools. Classes were organized on the basis of needs and abilities of the patient-students. The educational backgrounds and the interests of the

patients varied widely, for men were assigned to wards on the basis of disabilities and types of disease rather than educational achievement levels. It was not unusual to find a man with a grade school education in one bed and an ex-college professor, a doctor of philosophy, in the next. They had little in common, aside from their presence in the Army, except that they were both recovering from pneumonia. Since a considerable part of the teaching had to be done on an individualized tutorial basis, it was natural that qualified patients were used as teachers. In fact, their use was imperative. Schedules were complicated by admissions and discharges, for in no case were patients kept in the hospital when medical judgment indicated they could be discharged to duty.

In the technical schools the program was modified to meet the special needs of the patients. At radio schools, for example, special code-receiving sets and sending keys were placed in the hospital wards so that men could continue to increase their skill even while in bed. During certain hours of the day the wards were blacked out and the men sent and received blinker code. Patients who had formerly lost their code speed due to inability to practice were more proficient when they left the hospital than before admission.

Many methods of teaching were used. Hospitals were equipped with sound motion picture projectors and portable screens. In addition to military training films and entertainment motion pictures, both groups of ambulatory patients and bedridden patients in the wards saw not only the excellent orientation films such as *Battle for China*, *Prelude to War*, *The Nazis Strike*, and *Divide and Conquer*, but also a well-rounded and selected group of better travel, industrial, and commercial films. Newsreels, short subjects, and the latest as well as old issues of March of Time series and This Is America series were shown regularly. At all screenings an honest attempt was made to provide an adequate overview prior to the film and to follow it with an informal discussion of the salient points presented. As the great majority of the men and women assigned to the educational program were former teachers with formal training and

experience in education, the utilization of films was probably as effective as that found in the better civilian schools.

The majority of hospitals had central sound systems with outlets in all of the wards by means of a central loudspeaker or individual headphones. Newscasts, broadcasts of an educational nature, and educational transcriptions were played regularly according to schedule. In addition to informational transcriptions especially prepared by the military services, hundreds of others were made available by radio stations, networks, and near-by educational institutions.

Because the number of men involved in individual hospital programs was small compared with the large number involved in regular training, and because the hospital atmosphere was informal, group discussions were widely used. Utilizing pamphlets specially prepared for the armed services, publications of government and semipublic agencies, the hospital and base library facilities and periodicals for background material, a large number of topics was covered.

An attempt was made not to use the lecture type of presentation any oftener than was necessary. However, patients with unusual experiences, guests from near-by educational institutions and civic organizations, and outstanding leaders in the field of foreign relations, labor, economics, industry, or social problems were frequently scheduled to speak.

The facilities of the United States Armed Forces Institute were widely used in all hospitals, not only to enroll patients in correspondence courses for high school and college credit, but to employ their self-teaching textbooks as classroom texts for group instruction. Through this medium, it was possible for patients to enroll and study in practically any subject. In several hospitals, schools were run in conjunction with high schools, and patients were graduated from high school with diplomas issued by state departments of education. Extension courses were offered in several hospitals by neighboring colleges, and credits for such courses were transferable. Officer and enlisted instructors who had been civilian teachers were accredited by state departments of education. A large number of complete libraries with titles of both a wide and specialized type, originally

purchased for use in the Army Specialized Training Program and the Navy V-12 Program, were placed in hospitals.

Field trips to near-by military installations, places of interest geographically and historically, industrial plants, and special projects were held frequently so that the resources of the community and the area in which the hospital was situated could be utilized as much as possible.

SPECIALIZED ARMY AND NAVY HOSPITALS

Observation of the medical, physical, psychological, vocational, and social needs of men returning from combat brought the realization that the needs of these men could not be met through the precombat training programs of the early convalescent, reconditioning, and rehabilitation programs. In order to meet these requirements and to provide sorely needed beds in general hospitals, all branches of the service organized both specialized and convalescent hospitals.

Six Army hospitals (Walter Reed General Hospital, Washington, D. C.; McCloskey General Hospital, Temple, Texas; Birmingham General Hospital, Van Nuys, California; England General Hospital, Atlantic City, New Jersey; Bushnell General Hospital, Salt Lake City, Utah; and Percy Jones General Hospital, Battle Creek, Michigan) and two Navy hospitals (United States Naval Hospital, Mare Island, California, and United States Naval Hospital, Philadelphia, Pennsylvania) were designated as amputation centers. Following surgical care and physical therapy, men in them were given special training in the use of their prosthetic devices. Men with leg amputations were taught to climb stairs, to get in and out of automobiles, to drive, to walk up ramps and curbs, to get on and off busses and streetcars, to dance, to compete in as many sports as possible, and to carry on the activities of everyday living and working as effectively as possible. Arm amputees pursued the longer course of learning to strike matches, button clothing, tie shoestrings, remove coins from a purse, and use a telephone, and to relearn thousands of other activities that they had ceased to carry out. In teaching a man to look upon his disability realistically and objectively, two excellent films, *Swinging into Step* and *The Diary*

of a Sergeant, were issued by the Army for use in amputation centers.

At the Army's three centers for the blind (Dibble General Hospital, Menlo Park, California; Valley Forge General Hospital, Phoenixville, Pennsylvania; and Old Farms Convalescent Hospital, Avon, Connecticut) and at the United States Naval Hospital in Philadelphia, blind men were prepared for a new way of life. Through social adjustment programs men were taught not only techniques but confidence—confidence which stemmed from their own experiences in proving to themselves that although without sight, they could still carry on the activities of day-to-day living. Men were taught to travel by themselves, to avoid the so-called "blindisms" that make them conspicuous, to read and write Braille, and to type on both a standard and a Braille typewriter. They were given prevocational exploratory work experiences and vocational guidance, and in many instances were permitted to take short work assignments in near-by industrial plants and stores to prove to themselves that they could continue to be useful members of community life.

For men who had suffered severe hearing losses special programs were established by the Navy at the United States Naval Hospital in Philadelphia, and by the Army at Hoff General Hospital, Santa Barbara, California; Deshon General Hospital, Butler, Pennsylvania; and Borden General Hospital, Chickasha, Oklahoma. Here leading otologists, acoustical physicists and technicians, psychologists, speech and hearing therapists, and teachers of the hard-of-hearing conducted excellent programs of aural rehabilitation.

Similarly comprehensive programs were carried out in specialized centers for patients with other types of serious disabilities. Particularly dramatic were the advances made in the rehabilitation of men suffering from spinal cord injuries which had left them paralyzed in the lower extremities. Although there have been notable exceptions, until a few years ago the life expectancy of such victims was about two years. Practically all cases were bedfast or confined to wheel chairs. Death usually came from some type of infection, often of the kidneys. With the discovery of sulfa drugs, streptomycin and penicillin, most infections can

now be controlled. It is estimated that 80 percent of the 2,300 cases of paraplegias in the United States armed services resulting from the last war have learned or are learning to live independent lives with the aid of crutches and braces. Trained by therapists and rehabilitation specialists, they have learned to apply and remove their own braces, get in and out of bed, dress themselves, climb stairs, get up and down curbs and ramps, cross streets within the time that traffic lights change, and take care of their personal needs.

LESSONS FOR CIVILIAN EDUCATION

1. *Physical and Mental Activities as Restoratives*

Both in convalescent and specialized hospitals for the treatment of emotional illness, the armed services laid stress on competitive team play and discussion groups as methods of resocialization. Progressive and graduated calisthenics, and active recreation which included athletics, bicycling, horseback riding, fishing, swimming, hiking, and skiing, proved their value. Men played, talked, and worked out many of their problems and re-established wholesome attitudes. Educational activities and hobbies occupied spare time. These practices are equally salutary in the treatment of disabled persons in civil life.

Many general practitioners were given short, intensive training courses in psychiatric methods so that adequate attention could be given to the emotional illnesses of servicemen. A high percentage of men hospitalized for psychoneurosis were able to return to either full or limited duty. Films were widely used to aid men suffering from emotional breakdowns. Among them were the Navy's picture on combat fatigue and the Army's *Let There Be Light*.

For patients in general and convalescent hospitals who were returning to duty, there were intensive programs of physical rehabilitation, educational training, and psychological readjustment and resocialization.

Playing and listening to music were found to have definite psychological effect on patient morale. Men were taught to play the piano or stringed instruments in an attempt to re-educate arm,

wrist, and finger disabilities. Playing horns and small wind instruments was frequently prescribed for postsurgical chest cases. Strongly accentuated rhythm in proper cadence increased the limit of workload in group calisthenics. Music activities were not termed musical therapy because they were worthwhile leisure-time and enrichment activities. Journalism, radio broadcasting, dramatics, art, and handicrafts provided media for psychological adjustment and resocialization. Dramatic groups in many hospitals publicly presented Broadway plays. At one hospital in the East located near a well-known girls' college, full plays were regularly presented in the evening in conjunction with the college drama department. Many hospitals also presented patients' radio programs over local stations.

2. Work Experience and Vocational Guidance

For men who were to be separated from the service there were—in addition to physical reconditioning, educational training, psychological readjustment and resocialization opportunities—complete programs of vocational guidance based on achievement, aptitude, and functional tests and interests determined by short work experiences. In these short work experiences under expert vocational instructors, the patient had an opportunity to participate in a diversified program embracing commercial skills, photography, art, woodworking, metalwork, welding, machine-shop practice, leatherwork, automotive repair, and a large number of similar vocational fields. He learned not only what he liked to do, but what he was able to do in terms of ability and in terms of his handicaps. This information was then correlated by a skilled vocational counselor with the job opportunities in the field chosen, and the patient, upon discharge from the hospital, had a complete, objective vocational profile.

The philosophy, concepts, and many of the techniques developed by the armed services have been carried over into the hospitals of the Veterans Administration. Although Veterans Administration hospitals had both physical and occupational therapy prior to World War II, such programs were usually very limited. In only a few hospitals, where there were progressive

managers and competent therapists, were they adequate. In most places, however, occupational therapy was conducted for the benefit of the hospital rather than the patient. Men shoveled coal, cut grass, and repaired furniture for the hospital. This was known as "work therapy," but the primary emphasis was generally on the "work" without too much regard for the "therapy."

A well-rounded, comprehensive program of medical rehabilitation has been inaugurated in the Veterans Administration. Staffed largely by men and women who worked in military and naval hospitals during the war, the program will bridge the gap between bed and job by keeping the rehabilitation process continuous and uninterrupted from the time the man was wounded or injured until he is able to return to society as a self-sustaining citizen.

During the war, newspapers, radio, and the films carried stories of the wonders of medical science in opening new vistas of opportunity through the physical restoration, rehabilitation, and retraining of those wounded and maimed in battle. The disabled veterans themselves and the general public saw and were impressed with what could be done under comprehensive programs of rehabilitation. Now that the war is over, the inevitable and logical question arises, "If these advantages could be given to those disabled in military services, why can they not be given to those who are similarly disabled from accidents and disease in civilian life?"

3. Federal and State Civilian Rehabilitation Programs

The foundation for an adequate civilian rehabilitation program is in the state programs administered under the general supervision of the Federal Office of Vocational Rehabilitation. This program had its start after World War I when the government, recognizing its responsibilities to discharged veterans who had suffered disabilities in service that prevented their return to former occupations, established a federal program for their retraining for employment. The advantages of this program were so readily seen that in 1920 the Vocational Rehabilitation Act was passed, making vocational rehabilitation of the disabled civilian a legal obligation of government.

Until the amendment of the basic law in 1943 by the Barden-LaFollette Act, the program, which is administered by the states with the federal government matching state funds, provided vocational rehabilitation for only 210,000 persons during its twenty-three years of operation. Limited by severe legislative restriction of those eligible to receive service and by a fixed ceiling on federal funds available for state aid, the program was unable to meet the needs of the more than 2,000,000 severely handicapped persons in the nation. Under the present law, however, the disabled citizen is entitled to virtually the same treatment and training afforded the veteran under the vocational rehabilitation program of the Veterans Administration.

The federal and state vocational rehabilitation programs alone, however, cannot at present meet our rehabilitation needs. Although they have both the funds and the authority, they are handicapped by the lack of training facilities to which they can refer their cases. These state vocational programs do not carry out the actual rehabilitation and retraining themselves but use existing public and private facilities such as schools, vocational training courses and on-the-job training on a fee basis.

Medical, surgical, and diagnostic services are secured by contract with groups, clinics, and private physicians. Hospital care is purchased from existing hospitals. The same is true in physical restoration, which may include any type of medical or allied services that will aid in eliminating or substantially reducing an individual's disability as an employment handicap; for example, medical, surgical, and psychiatric services, physical and occupational therapy, hospitalization, dentistry, care in a convalescent or nursing home, drugs, supplies, and such prosthetic appliances as artificial limbs, braces, hearing aids, eyeglasses, and dentures. At the present time the greatest single obstacle to bringing opportunity to millions of disabled citizens is the lack of a sufficient number of rehabilitation centers staffed with adequately trained personnel, to which clients can be referred.

Early in 1945 it was recognized by the Baruch Committee on Physical Medicine that much had been learned in the rehabilitation programs of the armed services that would be of value in the care of physically and emotionally disabled civilians and in

overcoming the obstacles created by lack of facilities. A subcommittee on civilian rehabilitation centers, whose final report has now been issued, was appointed to work out a simple blueprint that would interpret war rehabilitation experience as it might apply to civilian needs. The report outlines the mission, organization, physical plan, and approximate cost of a community rehabilitation center and its importance to the community as a whole. Such a center would perform the invaluable service of centralizing and integrating all rehabilitation resources of the community with those of industry, labor, and existing social and government agencies.

4. *Community Rehabilitation Centers*

As envisioned by the plan offered by the Baruch committee, rehabilitation centers are to be constructed and operated on the principle of treating "the whole man," as was attempted in the rehabilitation programs of the armed services. Rehabilitation centers are not places for domiciliary care, old folks' homes, or institutions for incurables. They are training centers where those in need of rehabilitative care can go for physical rehabilitation, psychosocial treatment and adjustment, and vocational testing and training. For example, as was demonstrated in the armed services, the paraplegic, his lower extremities completely paralyzed, can be taught to walk with the aid of braces and crutches. When this is accomplished, he can, through counseling and aptitude testing, discover the kind of work for which his talents and physical abilities qualify him, and start retraining himself for a new job. When the period of training is completed, his abilities can be evaluated by a selective placement specialist who will help him to find a suitable job.

It is emphasized in the report of the Baruch committee that rehabilitation service and rehabilitation centers are community projects, and all existing facilities and organizations in the community must be fully utilized. The rehabilitation center must be an integral part of the community. It is necessary to know what the community has to offer in terms of personnel and equipment. Its program must be integrated, and duplication should be avoided.

It is expected that patients will be referred to the centers by industry, insurance companies, labor, the Veterans Administration, state rehabilitation agencies, welfare groups, hospitals, and physicians. The majority of the patients, or the agencies responsible for their care, will pay either full or partial fees for the service. With good business administration and the backing of the medical profession, government and welfare agencies, and insurance companies, a center, once established, in the opinion of the committee will be largely self-supporting.

Only a few rehabilitation centers functioning at the present time operate within the philosophy and scope of those proposed by the Baruch committee. As an outgrowth of the war, however, a number of centers offering widely diversified programs are in the organizational stage. In San Francisco a community rehabilitation center is being built under the sponsorship of the American Women's Voluntary Services.

With varying sponsorship, plans for centers are under way in Chicago, Detroit, Houston, Kansas City, and several other cities. In Bridgeport, Connecticut, where an excellent rehabilitation program is already functioning, leadership was first taken by the Connecticut Society for Crippled Children and Adults in cooperation with the State Division of Rehabilitation and the State Vocational Education Bureau. Later the local Junior Chamber of Commerce also became a sponsor and the center has developed into a vital community project. At Detroit the service is being organized and sponsored in association with Wayne University as an industrial rehabilitation project.

In Kansas City and Durham, North Carolina, rehabilitation centers are being discussed as living war memorials. Community leaders feel that there could be no more fitting memorial than an institution capable of making a continuing contribution to the handicapped.

There are in the United States approximately 6,500,000 males of working age who are either totally incapable of work or who are employed only on a part-time basis because of handicaps. The majority of these men can become employable only by re-learning skills which have been lost through disability. Given

such opportunity, they can, with good selective placement, become self-sufficient.

5. Demonstrated Possibilities

The armed services and certain outstanding community and civilian agencies, such as New York's famed Institute for the Crippled and Disabled, have demonstrated that physical and emotional rehabilitation of the disabled is possible. The Institute's staff, after twenty-five years of outstanding experience, estimates that up to 97 percent of all handicapped persons in the nation can be rehabilitated to such an extent that they can be gainfully employed.

That rehabilitation pays off economically has been shown by the reports of the Federal Office of Vocational Rehabilitation operating under the Federal Security Agency. Under its expanded federal-state program, in 1945 service was given to 161,047 handicapped men and women. Of this number 41,925 were rehabilitated sufficiently to obtain jobs that gave mutual satisfaction to the clients and their employers. The remainder were either cases who were still in the process of rehabilitation or cases for whom interview, counsel, and guidance were sufficient to meet their needs.

Of the cases successfully rehabilitated, almost 79 percent were unemployed at the time of undergoing rehabilitation and more than 18 percent had never worked before. More than two-fifths had one or more dependents. Half were dependent upon their families, public or private relief, or workmen's compensation; their average monthly income, including public or private assistance, was \$24. After rehabilitation their average monthly income increased to \$147. The annual cost of assistance to these cases and their families prior to rehabilitation was from \$300 to \$500 a case, while the total cost of their rehabilitation averaged \$300 a case, a completed rather than a recurring expenditure.

6. Value of the Handicapped in Industry

The recent increase of interest in rehabilitation is not entirely due to the accomplishments of the armed services; it is also a

result of the efforts made by the handicapped themselves during the wartime manpower shortage. Industry found in the disabled the only known untapped source of manpower while the disabled found for the first time a welcome sign on the personnel office doors of the nation. During the war 83 percent of the nation's industries employed handicapped workers. These industries found that there was a much smaller labor turnover, less absenteeism, fewer accidents, and equal or higher production rates among the handicapped than among the nonhandicapped workers.

Many employers, prior to this broad experience with the handicapped, had feared an increased accident rate if the disabled were employed. The industrial accident rate of eighty-seven of the great industrial plants in America, each having from 50 to 12,000 handicapped workers, has disproved that fear. Their reports show that 56 percent found the accident rate of the handicapped lower than that of the able-bodied; 42 percent found the rate the same as that of the able-bodied; and only 2 percent found it to be higher.

A statement of policy of the Association of Casualty and Surety Executives, which is composed of sixty-five major insurance and surety companies, explicitly states that no higher rate of workmen's compensation insurance is charged because of employment of disabled workers. Workmen's compensation rates are based on the number of claims and the cost of claims presented by a firm from year to year. Neither directly nor indirectly does the employment of disabled workers affect the rating schedule of a firm.

A survey of a number of industrial plants disclosed that approximately 19 percent of the occupations could be performed satisfactorily by workers having only one leg, 17 percent by operators who used crutches, 83 percent by men with only one eye, and 82 percent by the deaf. Although much work still needs to be done in analyzing the physical requirements of jobs and the physical capacities of workers in objective terms, the United States Employment Service has developed adequate tools and techniques to meet the placement needs of the majority of the handicapped in the population.

The answer to the utilization of handicapped workers lies, not so much in fitting the job to the worker as in fitting the worker to the job. Through this procedure the worker in reality becomes nonhandicapped as far as his particular job is concerned.

According to various studies most individuals use less than 10 percent of their potential energies in normal pursuits. It is only in emergencies that a person calls upon his tremendous reserves of physical power and ability. In many cases a worker's physical defect acts as a tremendous stimulus to overcompensation, resulting in extraordinary performance. Adler developed a complete system of psychology on the basis of this principle; he believed that the successful, the efficient, and the aggressive individuals were those who were compensating for an inferiority. The employer of handicapped workmen is putting that psychology into purposeful and gainful use.

The handicapped proved their worth during the war and were praised by industry for their efforts. But what happened then? When production was cut back immediately after VJ Day, industry dropped large numbers from its payrolls. Demobilized veterans started to return from the war in increasingly large numbers and more employees had to be released to make room for them. Dismissals were on the basis of seniority, and the disabled, being the last to be hired, in most cases were the first to be released.

The handicapped worker, after enjoying a period of economic prosperity, now finds that jobs for which he can qualify are no longer available in the loosening labor market. Greater production during the war allowed industry to break down job structures into small components, but today the average worker, instead of doing just one small highly specialized task, finds he must be able to do several. This demand for greater flexibility on the part of the worker further reduces his employment possibilities. During the war the job was adapted to the worker, but this is no longer done. The answer to the problem of present-day employment of the handicapped lies, then, in the rehabilitation of the worker to the level demanded by industry.

7. Application of Lessons Learned in War

The success of the armed services in the fields of rehabilitation and planned convalescence has demonstrated what can be done by planning and integrating medical care with the ancillary sciences to provide treatment of the whole man. It now remains for the nation to follow suit, to apply to its peacetime civilian needs the lessons learned from the war.

Hospitals are becoming increasingly aware that they can be made into institutions of opportunity as well as of healing. The long monotonous hours of convalescence that are wasted in hospital wards can be turned into periods of useful and productive activity which will aid the patient in his reorientation to normal living. Classes in dietetics, prenatal care, home nursing, consumer buying, and household mechanics could make convalescence in the women's wards an interesting and profitable experience. Woodworking, photography, radio repair, and other activities could give patients both instructional and avocational opportunities. All types of literature on foreign affairs, democratic living, homemaking, avocations, and hobbies are readily available. Qualified volunteers can be obtained to teach under the supervision of a small professional staff. Hundreds of interesting films are available for the asking. With such programs, bodies and minds will heal more rapidly.

The primary reason why most people fail to participate in adult education programs is lack of time. The usual answer is, "I've always wanted to learn something about that and I'd like to take the course, but I simply haven't the time." In the hospital are patients with plenty of time, but with nothing to do. Surveys have shown that the average patient spends a tenth of his hospital stay in pain and nine-tenths in boredom. He has time—time that might well be utilized productively and purposefully by planned programs of adult education similar to those which were used in the hospitals of the armed services.

That the rehabilitation programs of the armed services have influenced education is already beginning to show in our schools and colleges. In innumerable schools, the atypical child who in the past had been excused from physical training classes is now

receiving constructive aid from a physical education teacher who worked in one of the military or naval rehabilitation programs. During the past two years there has been a marked increase in the number of courses in varied services to the handicapped which are being taught in our colleges. Also, departments of physical medicine and medical rehabilitation are becoming a part of medical training.

Experience with physically and emotionally wounded soldiers has given us new knowledge and new tools in rehabilitation—the third phase of medical care. Paradoxical as it may seem, out of the destruction and suffering of war may come new opportunity and hope for the nation's disabled millions.

Part Three

IMPROVING INSTRUCTION

IMPROVING INSTRUCTION

1. To an extent not common in American public education, curriculum construction in armed services training proceeded in close accord with the principles that the training should have a well-defined objective which was modifiable if necessary, should be realistic, and not vaguely abstract, and should be synchronized and integrated, and free of nonessentials. Though not always easily applicable in general or liberal education, these principles are adaptable to specific vocational training.

2. The experience of the armed services in producing and using a great variety of visual, auditory, and tactile aids to learning, on a scale much more nearly universal than ever achieved in American public education, emphasizes the time-saving qualities of these approaches to concreteness and realism in instruction when devised and employed with requisite skill.

3. Recent and forthcoming technological and artistic improvements in the manufacture of visual and auditory devices require that alert efforts be made to keep American educational practices abreast of the possibilities in their acquisition, adaptation, and use for vocational and general educational purposes at all levels.

4. Local ingenuity in devising mechanical aids, due caution against inept use or the intrusion of commercial or other ulterior motives, systematic studies of the effectiveness of multisensory aids in schools, and regional and national surveys of methods of facilitating good production and extensive use of appropriate devices, all have places in a sound program.

5. The armed services necessarily produced thousands of textbooks and manuals for trainees and instructors, generally characterized by brevity, simplicity, readability, good use of a variety of types of illustrations, and popular appeal to the trainee's understanding and emotions. Principles presented in them were usually adequately illustrated by interesting examples of their application. The foregoing characteristics are valuable in textbooks for all schools at all levels.

6. Manuals were cooperatively prepared by committees of instructors, supervisors, and outside experts, both civilian and military; they were revised with great frequency to fit new developments and recognized needs. Both the cooperative method and the local publication of appropriate supplementary materials have interesting possibilities in civilian schools.

VIII. GENERAL CURRICULUM IMPLICATIONS

THE ARMED services, in training personnel, had to telescope into months processes that in civilian education ordinarily extend over many years. Program outlines were developed almost overnight, revision followed revision with a rapidity unfamiliar in civilian life, and training establishments and materials of instruction were created and modified at a pace unknown prior to the emergency. Some significant military programs were conceived, developed, and terminated in a matter of months. Their effectiveness was predicated upon the clarity with which their objectives were defined, upon the ability of the responsible agency to acquire suitable facilities and instructors, and upon the quality and interests of the trainees, upon the concept of the end being more important than the means to the end, upon the instructional materials available for the job at hand, upon the extent to which training situations approached the actual situation in which trainees would find themselves when on duty.

The training effort apparently did not produce any basic "discoveries" about curriculum. Out of the experience of the armed services in the training of 12,000,000 men it is not clear that new concepts have emerged to take their places beside our presently held concepts in general education about the importance of the objective, the need for curricular revision in the light of social change and scientific advancement, the desirability of adjusting the curriculum to the individual, the relatively greater effectiveness of learning experiences that involve doing rather than only listening or reading, the importance of instructors' guides and of suitable materials and aids in the implementation of a particular course or program, and the power of motivation and learner purpose in attaining objectives.

It is not a cause for disappointment, however, that the armed services failed to develop any "curricular atom bombs." On the contrary, it is reassuring to know that the best practices in the armed services were a reflection of the best thinking in civilian education.

The important fact is that from the training effort of the armed services, educators can attain a fuller appreciation of the importance of a clearly defined objective, learn to be less timorous about curricular revision, acquire a better understanding of the relationship of materials of instruction to the curriculum, and gain a surer insight into the meaning of realism.

The introduction to the draft of the War Department's overall history of emergency-period training emphasizes the fact that the purposes and the atmosphere of military training and the purposes and the atmosphere of civilian education are fundamentally different.

The ultimate objective of Army training is combat. . . . It is the instructor's duty to make his pupils understand the practical battle value of the knowledge taught. In military training, men are not only asked, but are ordered to learn. Individual desires are secondary.

Despite this difference, however, success of the armed services training effort during the emergency constitutes an open challenge to civilian educators to think about the objectives of American schools and colleges.

A Navy guide for curriculum construction contains a significant observation that training falls down when the specific objectives of particular courses or aspects of the curriculum are not properly specified. This observation does not come as something new to civilian educators, but it does merit their serious consideration because it was written after four years of training effort by the Navy, and reflects considerable experience—much of it bitter—in the preparation of men for duty assignments.

Example after example could be offered, both from the Army and from the Navy, of programs that at first produced only partially satisfactory results because their objectives were not, or could not at the time be, clearly detailed and that later succeeded admirably after specific direction was given them. With the fate of the nation in the balance, however, the armed forces could not tolerate vagueness; they had to train with maximum effectiveness in the briefest possible time. Their answer to the challenge faced in training the fighting men was to determine, for each course and program, concrete and specific objectives that were valid in

the light of the actual conditions of combat that the men would ultimately be called upon to face.

For example, specialists in the Army Ordnance Department were taught how to repair certain types of automotive equipment, but they were not trained to be general machine-shop workers. First-year students in the Army's elementary Japanese language program were expected at the end of the year to know 1,100 *kanji* (Chinese) characters and the two sets of 48 *kana* (Japanese symbols designating the sounds of syllables), and to be able to speak Japanese well enough to get food, shelter, clothing, and transportation; but they were not expected to have acquired a literary appreciation of the language. The Medical Department taught soldiers both how to handle a litter and how to operate automatically as teams, so that there would be no need for a battlefield conference, however brief, as to who would do what in a given situation.

Overseas returnees helped to clarify the concepts of training officers as to the kind of jobs their charges would ultimately have to fill; and many returnees were placed on the teaching staffs of training agencies so that the agencies could benefit firsthand from their experience.

The history of training in the Army Ground Forces discloses that one of the basic principles in training was that realism is "the criterion of effective training." The Desert Training Center, live ammunition courses, the village fighting course, the close combat course, and similar activities illustrate what Army Ground Forces were striving for in teaching methodology. It was to create learning situations in which the trainee not only learned by doing, but in which he learned by doing in a situation that approximated real battle as nearly as considerations of safety and public opinion would permit. Field problems, simulated battle missions, shipboard training, and army and fleet maneuvers were expressions of an effort in all components of the armed services to inject realism into the curriculum.

Effort had to be directed to the development of learning activities in which battlefield conditions were simulated, but in which physical danger was minimized. The fleet and the armies in the field were constantly calling for more and more realism in

training; but training agencies were always circumscribed by the requirement for a reasonable margin of safety. This forced training agencies to subject the concept of realism in the curriculum to careful analysis. They had to approach the problem of infusing realism into the curriculum with the practical limitations of the teaching situation in mind. In this respect, military instructors were in the same situation as civilian educators. It is for this reason that the armed services may have something to teach civilian educators about realism in the curriculum.

LESSONS FOR CIVILIAN EDUCATION

1. *The Concept of the Objective*

The written objective, in civilian education as well as in military training, is a statement of intent to teach one thing and, by implication at least, not to teach something else. No one who is familiar with the intrinsic differences between the problems of military training and the problems of general education would suggest that civilian educators carry the concept of the concrete and limited objective to the extreme that it was carried by the armed services.

The urgency and the drama of armed services training sometimes becloud the fact that civilian educators are daily faced with far more complicated problems of teaching emphasis than were the training specialists in the Army and the Navy. Civilian schools and colleges must prepare the learner for a life of productive activity. The whole of human knowledge is the reservoir of their subject matter. They cannot take responsibility for selecting a boy at an early age and deciding that he will be taught to fit into a specified niche in society.

The armed services had merely to develop a fighting machine in which equipment and men were integral parts. They could, and did, decide that one man should learn to fill just one assignment in which his duties would require his possessing a few specific understandings and skills. If the man was selected to become an ordnance mechanic, his subject matter was the guns that he was to be required to service; and determining what the objectives and content of his limited training would be was a far simpler matter

than determining, for example, what the valid, specific objectives should be in a machine-shop course in a cosmopolitan high school.

The Army and the Navy sought to define the exact purposes of every course and training program, and to hold instructors and trainees responsible for accomplishing just so much and no more in every course or training program. The armed services experiment in large-scale, accelerated training indicates that effective teaching can be expected only when objectives are clearly established. If civilian educators can claim credit for enunciating the principle that the objective not only establishes the goal of training, but also determines the criteria for evaluating the success of the learner, the armed services can claim credit for conclusively proving the validity of the principle.

2. The Objective May Change

Because the armed services emphasized the objective as a concrete and limiting goal, it is not to be presumed that their objective was fixed and immutable. On the contrary, the armed services specific training objective was dynamic. It was intended to change as soon as battlefield experience indicated the need of change. The Navy, for example, specifically stated that objectives are not static, but constantly changing. From time to time a re-examination of the objectives, and hence of the curriculum, was made.

In civilian education, old elements of the curriculum in schools and colleges die hard; and new ones must often wait for grudging permission to edge their way in, first as short-term projects to be conducted on special occasions like National Safety Week or Brotherhood Week, then as emphases theoretically to be infused into all pertinent aspects of the traditional curriculum, and finally as subjects in their own right.

This situation did not obtain in armed services training. Change was consciously and continuously sought; and it was the old elements in the training program that were always on the defensive. The Army and the Navy felt no more compunction about eliminating a course or an emphasis in a course that had outlived its immediate usefulness than they did when discarding one weapon in favor of a newer, more effective one.

No matter how urgent had been the need to inaugurate a course in a particular specialty, it was discontinued when it had produced an adequate supply of men trained in the specialty. Other reasons for eliminating courses in the armed services were: (a) failure of the course to produce results that justified its continuance; and (b) discovery that a training need could be most directly satisfied by eliminating a course and inaugurating a better conceived course in the same specialty. The underlying principle is of significance to all educators. Whenever a course, for any reason, fails to meet an actual need, it should be eliminated from the curriculum.

The armed services during a five-year period of emergency training performed what is, in effect, a controlled experiment in the operation of the concept of change in curriculum development. The factors that surround curriculum development were not necessarily the same as those that are met in the more complex civilian educational situations; but it must be remembered that most currently accepted principles or assumptions about the nature of the learning process are derived from controlled laboratory experiments whose factors are seldom, if ever, duplicated in a classroom situation.

Faced with the changed conditions of a new, postwar world, civilian education can well emulate the efforts of the armed services to keep the curriculum as much as possible abreast of the situation that the learner will ultimately face on his own. The armed services did not fear change: the thing they feared was the possibility that they might not be changing fast enough.

3. *The Concept of Realism*

The Armed Forces training during the emergency was, in effect, a vast experiment in the search for realism in the curriculum. To civilian educators, the experiment is noteworthy for the following reasons: Attainment of realism is a function of teaching methodology. Merely learning by doing is not enough. The "doing" must take place in exercises or projects that approximate as nearly as possible situations in which the attitudes and skills being acquired are intended to function.

Exercises and projects which create realism in the curriculum are the result of careful planning and controlled development. A promising exercise, developed at one installation, was quickly adopted, either voluntarily or upon direct orders, by other installations responsible for training a given classification of personnel; and an effort was made constantly to improve the exercise by pooling the experiences of all the affected installations. In civilian education, where goals are much harder to identify than in military training, it would appear that planning and controlled development of realistic learning activities are no less vital.

The importance of sharing information on effective exercises and learning projects is apparent. "Realistic" learning exercises in the armed services were the common property of all training agencies, and many exercises improved over the years because each agency employing them contributed new elements. One of the most important functions of supervisory headquarters, like the School and Replacement Command of Army Ground Forces, was to act as a clearinghouse for effective teaching activities. In civilian education, it would seem that every effort to improve teaching by publicizing effective learning activities should be encouraged.

Curriculum committees and curriculum specialists should consider it a part of their work to include descriptions of effective learning activities in the written guides they prepare for particular courses or segments of the curriculum. It might be well, too, to give those persons responsible for writing a particular curriculum guide, the continuing responsibility to publish, from time to time, descriptions of new activities gleaned from personal experience or from a survey of the pertinent professional literature, with which all teachers in a given subject area should be acquainted.

Experimental centers sponsored by school systems, colleges, and national foundations need no stronger justification for their existence than the hope of developing effective teaching methods in the particular subjects that they offer.

Interchange of information on effective learning activities cannot stifle originality; the surest guarantee of democracy in the

schools is in a cooperative search for the means of attaining realism in their field by teachers of a given area. The armed services found that to create exercises that could be validly characterized as realistic, contributions from many training agencies were needed.

Learning activities are not realistic merely because they are dramatic. Most realistic learning situations do, however, possess an element of the dramatic, but the tendency to consider elaborate projects realistic because of the drama inherent in them is questionable. In military training and in civilian education the justification of a learning activity is found in the outcome that it effects, not in the eye-appeal of the activity to the onlooker or the participant.

4. The Concept of Integration

The best lessons that the experience of the armed services can teach civilian educators about integration can be found by examining certain types of college-level training conducted by the Army and the Navy.

The language-area programs are excellent examples, worthy of study by educators interested in curriculum development in the secondary school and in colleges. In these courses there was a planned interrelation of subject matter in language, ethnology, history, political science, economics, geography, and other subjects that could contribute to the trainee's understanding of a people in a given area. Programs in military government also can be commended to the attention of civilian educators because of the lessons that they taught about the feasibility of interdepartmental, cooperative planning and effort in the conduct of college-level instruction.

A study of all pertinent literature in armed services training will bring out the following conclusions concerning integration: Integrated programs are effective because they are necessarily predicated upon clearly defined purposes. Integration can be attained only by careful planning. Integration can be assured only if there is continuous interdepartmental cooperation, preferably through a formally constituted coordinating committee.

5. Importance of Physical Facilities, Materials of Instruction, and Training Aids in Curriculum Development

A visitor at any major training installation in 1944 and 1945 would have been deeply impressed with the size and complexity of the physical plant, with the wealth of printed and mimeographed instructional material available to the instructors, and with the quantity and the character of the training aids on hand. If effective training could not be conducted in such surroundings, the visitor might well have thought, effective training could never be attained.

A comparison of armed services training in the years before suitable training installations were constructed and before effective instructional materials and training aids were developed, with armed services training in 1944 and 1945, reveals cogent implications for civilian educators. It re-emphasizes the importance of the properly planned and equipped school plant to the implementation of the effective curriculum; and, conversely, it demonstrates how difficult it is to implement an effective curriculum in an obsolete plant.

It shows the importance of incorporating into curriculum guides concrete suggestions on training equipment and training aids requisite in the proper implementation of the curriculum. It shows that every effort that is made to encourage the development of new training aids and to bring them to the attention of teachers who should use them, or aids similar to them, is justified.

It suggests the desirability of cooperation between educators and commercial manufacturers in the task of determining the content of educational films and other audio-visual training aids.

It should spur educators to redouble their efforts to convince taxpayers that money invested in improving school plants and procuring effective instructional materials and training aids is well spent.

6. Place of the Instructor

Curriculum development and effective instruction are inseparable. Every major component in the armed services sponsored a type or types of instructor-training programs. In certain components, central instructors' schools were established; other

components relegated the responsibility for instructor training to school or department heads. Instructor training was usually conducted with a particular curriculum in mind.

The Standards and Curriculum Division of the Navy is emphatic in its belief that:

Instructor training is more effective if it takes place in the subject-matter area of the instructors involved. In more recent years, civilian education has tended in the direction of assuming that teaching methods can be taught effectively to mixed groups regardless of the subject-matter interests of the individuals involved. Navy experience demonstrates in part, at least, the fallacy of this assumption. Especially in technical fields, instructor training has proven more meaningful if it is carried on in the subject-matter area of the individual instructor.

This point of view is not a categorical condemnation of present teacher training in civilian colleges and normal schools. The Navy frankly admits that its instructor-training problems were different from the problems of teacher training in civilian life.

In-service training of teachers is essential if instructors are to give the best possible expression to a curriculum developed in their school system or college. Workshops, observation centers, and supervisory conferences are mechanisms for the improvement of the curriculum. School systems near teachers colleges might well encourage the colleges to give brief courses in methodology which is applied not only to a particular subject, but to a specific course or program conducted in the school system as well. The more directly in-service training applies instruction in methodology to problems that the instructor meets in his efforts to implement a given curriculum, the more successful the teacher is likely to be.

7. The Use of Specialists in Curriculum Development

The Navy, which in late 1942 established the Standards and Curriculum Division in its top training headquarters for the purpose of bringing order out of chaos in Navy curriculum development, provides several examples of the progressively better utilization of the specialist in program building. Recruit training in the Navy, for example, was in great need of standardization as late as the spring of 1943. Prior to this time, the recruit

training centers exercised virtual autonomy in the conduct of their training activities.

The Training Division in the Bureau of Naval Personnel prescribed merely the over-all time limit for training cycles and established as the general objectives of the training the development of promptness and willingness in responding to orders, of habits of personal cleanliness, of the ability to live without friction in close contact with others, and of familiarity with naval parlance and customs. The number of scheduled hours of instruction and the emphasis upon the several phases of training varied widely in the several centers.

It was decided, however, to construct the program inside the Standards and Curriculum Division before inviting criticism from the field. The program that was submitted to the centers is reported to have been "academic in the extreme." It showed little regard for the fact that facilities differed from center to center. It still gave too much time to drill and physical exercise, and it overloaded the program with such subjects as boat handling and deck seamanship, which are more properly taught after men are assigned to operational units.

Thus the recruit training program conceived in a central headquarters by specialists far removed from the actualities of the training situation failed to accomplish its purpose and was not used until suggestions from the utilizing centers were incorporated into it. The important fact is that a satisfactory standardized recruit training program was finally developed, but only after the specialist or specialists responsible for writing the outline of the program had established a working relationship with the agencies that were to implement the program.

Throughout 1942, there was a great lack of uniformity in the training of gunner's mates at different stations responsible for ordnance instruction. Participating agencies tried to give instruction in the servicing of all varieties of small guns, machine guns, and commonly used dual-purpose guns. Certain stations allotted an inordinate amount of time to guns that had comparatively little battle use; and, in the training agencies as a group, too little time was allotted to such subjects as ammunition handling and the

use of hand tools. Theoretical work was stressed at the expense of practical shop experience.

To rectify this situation, the Standards and Curriculum Division, in January 1943, proposed its own standardized program of training for gunner's mates. The program was promptly rejected by the director of training as "academic in the extreme." In its second attempt the Standards and Curriculum Division again used specialists in the central headquarters, but this time the program "was a much more workmanlike job than its predecessor." It was drawn up in strict reference to prescribed qualifications for gunner's mates, and benefited from the fact that the officer charged with responsibility for preparing the outline of the program visited one gunner's mate school and conferred with the gunnery officers of three destroyers. This contact with the field was admittedly inadequate, but it did have some value, which was reflected in the revised program.

It was not until 1944 that all schools were able to provide two hours of shopwork for every hour of classroom instruction, as prescribed in the program outline. In that year's time, also, officers of the Standards and Curriculum Division had opportunity to take field trips to schools for gunner's mates to acquire detailed information about difficulties encountered in implementing a training program in ordnance; and closer liaison had been established with the fleet in the matter of obtaining information on the kind of training that was desirable for gunner's mates. It was possible in August 1944 for the Standards and Curriculum Division to construct a program acceptable to all concerned.

Extensive use of the specialist to build training programs was made by the Army as well as the Navy. Unlike the Navy, the Army has not yet prepared a series of studies on different procedures utilized in developing training programs. This lack of documentary evidence does not change a situation to which many can attest: that a great proportion of the training programs in the Army was produced by specialists. In fact, it is safe to assert that specialists prepared most of the armed services training programs which were "standardized" in the sense that they were intended for use in more than one training agency and were developed by specialists at headquarters having a supervisory rela-

tionship to the several subordinate training agencies involved.

In the Army, as well as in the Navy, programs so developed were often at first somewhat academic because at times they had to be developed for types of training never before given. The first programs for center-level training and for unit training were developed without clear understanding of the exact nature of the battlefield conditions that would ultimately face the trainee.

Throughout the armed services, the development of training programs was often entrusted to one person or to two or three persons working in a higher headquarters. At first their product was academic, either because there were too many unknown factors inherent in the total training situation or because inadequate liaison was maintained with the field. As the training situation began to be stabilized, the headquarters in which the specialists worked became clearinghouses for the problems of subordinate training agencies and for information from the battlefield. From their vantage point in such headquarters, specialists were able to produce programs and program guides that were useful in reducing the degree of variation in the training of the same type of personnel at different agencies.

8. The Use of Committees in Curriculum Development

The use of committees (which were usually designated "conferences" in the Army) in program development was encouraged in the armed services; and it is safe to state that, if detailed accounts on the development of all courses were available, it would be found that some sort of committee or conference activity was involved in the development of large numbers of armed services programs. One would discover that, at the very least, the decision to create a new program or to revise an old one grew out of conferences between representatives of several headquarters, and that concurrences from interested headquarters and approval of responsible headquarters were required before any program was put into effect.

Committee action is part and parcel of the military situation, where coordination is the key to victory. It should come as no surprise, therefore, that the Army and the Navy made capital

use of the conference or the committee method in developing some of its major training programs.

The Provost Marshal General's Department, another component of Army Service Forces, developed the first language and area courses by pooling the efforts of military personnel and of distinguished linguists, geographers, and political scientists nominated as consultants by the American Council on Education.

The historical reports on the development of the major training programs in Army Air Forces make frequent mention of conferences held in the interest of improved training. Conferences, for example, were held on preflight training in December 1942, after the experience of the Eighth Air Force in the autumn of that year reflected the need for increased emphasis in preflight training on such subjects as aircraft recognition, naval recognition, and the sending and receiving of code.

The training of groundcrews also was revised early in 1943 as a result of a conference held in late 1942. Similarly, a series of conferences on advanced pilot training is reported to have taken place beginning in February 1943 between representatives of advanced flight schools and of fighter and replacement training units, for the express purpose of redirecting advanced pilot training in accordance with the needs of operational units.

CONCLUSION

Students of education and interested laymen alike have been challenged, by their general knowledge of what the armed services accomplished, to think in terms of lessons that civilian education can learn from a detailed and penetrating study of the training efforts of the armed services. Civilian educators brought to their military and naval assignments the training and experience of their peacetime profession. What factors in the armed services training situation and what new approaches to the problems of teaching, then, contributed to their success in the Army and the Navy? Can some of the facilitating factors be duplicated in civilian education? Can new, effective procedures for handling problems of teaching be adopted with profit by American schools and colleges?

Here have been discussed some lessons that civilian education can learn from the armed services about curriculum development. The same source materials can be profitably submitted to further study by educators. Implications should be checked against controlled experiments by students of education and against research projects involving surveys of opinion among former instructors and trainees in the armed services. The possibilities for continued study of armed services training are indeed great.

IX. AUDIO-VISUAL AIDS TO LEARNING

THE EXTENSIVE employment of training aids so characteristic of Army and Navy training at the conclusion of World War II was the result of an evolutionary development which had been directly affected by numerous factors. These various influences impinged upon the development of training aids in varying degrees, but their total impact is so significant that some consideration of them is a prerequisite to the proper appraisal of the importance of training aids in military instruction.

At the inception of the national defense program in 1939 and 1940 both the Army and Navy indicated in official publications a recognition of the importance of audio-visual aids. In the main this recognition was of motion pictures and filmstrips, although some encouragement was given to the use of models, maps, and other related devices. Though actual reliance upon various aids to teaching was relatively meager at the outset of the war, an official "climate of opinion" existed which later served as a strong motivating factor.

RAPID EXPANSION OF TRAINING

In September 1939 there were less than 200,000 men in the Army and less than 100,000 in the Navy. By the end of 1944 approximately 12,000,000 persons were in military service. In 1945 the Army had approximately 650 different specialized jobs and the Navy 450 specialties and ratings. This dramatic expansion of the armed services contributed to a growing demand for quick methods of instruction. Older schools mushroomed into huge training centers and thousands of new centers arose almost overnight, creating a constantly growing demand for instructional materials other than the usual Army and Navy manuals and textbooks.

The rapid expansion of military training was coupled with a feeling of great urgency. Military plans were formulated on the basis of definite quotas of men to be at a designated place at a definite time. Sufficient time simply was not available for developing a thorough command of the essentials of many mili-

tary jobs. Thus there arose a situation which often led to groping for faster and more efficient approaches to training inductees. Oftentimes this latent demand for different materials of instruction was uncritical and tenuous. Numerous surveys in both the Army and Navy disclosed that even available films were nearly as often misused as they were appropriately used during the early days of the war. Yet this constant pressure to get men ready for battle front duties afforded a stimulus to instructors to rely upon so-called "faster" methods of teaching.

Resources and Equipment

All of the numerous influences contributing to the development of training aids programs might have been ineffective had it not been for the fact that the cost was a secondary consideration. Lack of money seldom, if ever, retarded the development of almost every conceivable type of training aid. In fact, no needed resource was beyond reach of the military establishment if it were believed that this resource could contribute to more efficient training. Thus perhaps the most influential factor of all in the use of training aids was the availability of financial resources.

Despite the availability of almost limitless resources for training purposes, this condition alone did not assure the presence of guns, tanks, planes, and other implements of war for instructional use. Especially in the first two years of the war actual implements of warfare were not sufficiently available to meet all demands. Consequently hundreds of schools were forced to rely upon outmoded equipment or crude substitutes with which to train. Museum pieces and salvaged instruments became means of instructing thousands of trainees. Histories of both Army and Navy training programs stress repeatedly the extent and nature of local improvisation during the period of rapid expansion. This lack of modern equipment afforded further stimulation for planning and developing widespread use of standardized training aids.

Scarcity of adequate equipment and training aids was paralleled by a scarcity of trained instructors. Various surveys of instructor personnel indicated that more than half of the military

instructors in the early days of the war had had no previous teaching experience or training for teaching. These instructors were likewise unfamiliar with much of the content and skills they were called upon to teach. In this somewhat chaotic situation standardized training aids seemingly afforded the most practicable solution.

The content of standardized aids was at least accurate and in a sense constituted the minimum essentials in numerous training programs. The conclusion is self-evident then that the inadequacies of hundreds of instructors as revealed by professional teaching standards did accentuate the need and demand for multitudinous training aids.

Civilian influence in the training aids programs of both the Army and the Navy constituted a significant factor in the development, distribution, and utilization of these aids. The military organization could assume that the value of audio-visual aids had been demonstrated. During the thirties many of these aids were "on trial," but with the advent of rearmament the trial period apparently was over. In many instances "civilians in uniform" provided much of the "know-how" for both production and use. The conclusion is therefore certain that civilian practices and skills became a major impetus to the rapidly growing emphasis on visual and other sensory media.

Military Direction and Control

The most pervasive influences throughout the Army and Navy training which tended to extend the production and use of training aids were *military* dominance and control of training. Directives and doctrine in a military institution have the effectiveness of legal compulsion. If it was considered advisable, for example, for all trainees to see a particular film, the trainees saw the film. A dramatic example of this thoroughgoing influence is the fact that virtually every man in the Army saw the movie *Two Down and One to Go* within ten days after VE Day. From the smallest military school in this country to training programs on the battle fronts, official recognition of the value of audio-visual and other teaching aids gave impetus to their use.

These various influences then set the stage for an elaborate and

extensive training aids program. Local and central concern for production and use of these heterogeneous teaching aids was the logical outcome of such an educational climate.

TRAINING AIDS USED IN THE ARMED SERVICES

Certain factors present in all learning situations received considerable emphasis in the training of military instructors. Voice and diction, gestures, and personal eccentricities were emphasized as essential considerations in evaluating the results of teaching. While these characteristics of teaching are not generally considered training aids, their importance extended to appropriate classroom use of training aids. Both the Army and Navy operated instructor-training schools and in-service training programs in which considerable emphasis was given to such personal prerequisites of good instruction. These various personal qualities of the teacher also received treatment in literature designed to indoctrinate instructors in the use of blackboards, "chalk talks," lecture-demonstrations, and open-air exercises.

Graphics

Charts, maps, graphs, posters, and cartoons were among the most widely encountered graphic aids. Use of them in military training was in reality novel only in the extent to which they were used. They were found in practically every classroom. In a few instances certain innovations were also used. For example, portfolios of these various graphic devices were often employed to demonstrate shapes of tanks or aircraft, or to illustrate steam and Diesel installations aboard naval ships. By means of perspective drawings it was possible to show parts of such equipment in relation to the whole installation.

Another adaptation of graphics can be observed in the widely distributed maps which disclosed both geographic factors and topographic features of a particular area. For small areas, such maps simulated aerial photographic views. Likewise, combining perspective sketches with conventional blueprints to illustrate both the parts of a piece of equipment and the function of those parts demonstrates how experimentation with graphics was attempted by the armed services.

The terms "chart" and "poster" were often used synonymously by instructor and trainee. In reality, however, each of these types of graphic aids possessed a distinctive function. Charts are designed primarily for artistic presentation of essential facts and principles. Posters are likewise artistically designed, but are intended primarily to influence human behavior. Consequently, the posters were more than just attractive—they were simple and direct and employed the emotions of anger, love of country, fear, ridicule, pathos, and satire. Comprehension and retention of the simple lessons presented in posters were encouraged through constant repetition and by their presence in all areas frequented by trainees.

The use of posters to appeal to emotionalized patterns of behavior is a good example of how graphic aids in general can be employed as a means of informal education. The spare time of the soldier or sailor often became the means of implementing this program of informal learning. Series of posters on discipline, fire prevention, security, and similar subjects were placed everywhere and contributed to the development of predetermined behavior patterns. Similarly, weekly large-scale war maps, produced for both the Army and Navy, and well-known cartoon characters continued this program of informal education. Superman made a contribution to the war effort by coming to literacy training centers of the Navy.

Demonstrations and Devices

Devices of all kinds were used widely in instruction for both demonstration and practice purposes. "Real" objects were in many instances preferable, but the real objects of war were often difficult to procure, especially in 1942-43. Hence many instructors constructed teaching devices from scrap piles and "crack-ups." In the later years of the war improvisation ceased to be a necessity. Yet it had been found that in certain areas of military training synthetic devices possessed advantages over real equipment. In aviation training in particular this reliance on special training devices assumed a place of great significance.

One type of Link trainer, for example, afforded the cadet pilot a moving view of the earth over which he was passing,

provided the sound of aircraft engines by means of recordings, and presented him with problems encountered in actual flights. This attempt to achieve a sense of reality in training by the use of training devices extended to other areas than aviation. Communications training in the presence of battle noises, fighting fires aboard "land" ships, and reconstitution and administration of blood plasma demonstrate this widespread dependence on training aids to lend reality to training without the usual dangers accompanying instruction in the actual situation.

Mockups

The training devices just described were particularly designed to develop dynamic skills and judgments necessary for successful operation of equipment. Acquisition of the more static skills characteristic of maintenance and repair depended considerably upon experience with actual objects or mockups of such objects. To illustrate: an ordnance repairman had to know the intricate mechanism of a piece of ordnance equipment in order to perform his duties. Thus the how-it-operates and why-it-operates levels of training exercised considerable influence over the types of training aids. The why-it-operates phase of instruction demonstrated a high degree of reliance upon mockups of all kinds of equipment.

Models

Many other types of devices were also found in Army and Navy classrooms. One of the most common was the model, which varied in size from the small aircraft model to a huge display model of the Quartermaster Corps. This latter depicted an entire theater of operations. It was built of concrete, painted to indicate vegetation, and showed the rear, center, and forward areas as well as the base of the division and the combat zone. All military installations were completely shown and the instructor demonstrated the nature of salvage operations while walking through the model discussing supply problems. Similar illustrations could be taken from other branches of the Army and from the Navy. The use of obstacle courses, battle and jungle courses, tropic buildings, German and Oriental villages,

and terrain layouts shows how large models played a significant part in conditioning men for military engagements.

In the usual military classroom, models served a great variety of purposes. Learning how to pitch a tent, how to load a freight car, how to prepare field sanitation installations, and how to recognize ships, tanks, and planes were a few of the many uses made of models. In the final training and briefing of men for invasions, models also played a role. For example, sponge-rubber map models of Leyte showed the topography of the island and probable anti-invasion preparations of the enemy. Such map models were also employed to orient pilots concerning approaches to the island, what to bomb or strafe, and where enemy concentrations might be expected.

Instructional models were generally made of salvaged equipment, wood, metal, or plastic. Plastics perhaps demonstrate the most unusual experimentation of military schools in designing and developing models. For instance, in certain schools transparent plastics were used for the outer covering or shell of various automotive mechanisms, thus making possible observation of actual operation of equipment.

Breadboards

For instruction in electrical systems, radio, and ignition systems, models of necessity possessed certain deficiencies. Hence the training aid developed for those objectives was generally a "breadboard" layout. By means of this aid, the circuits of a particular service radio could be shown on one large board, with condensers, resistors, and tubes functioning properly. Thus circuits could be traced, the functions of each part made clear, and the seemingly complex maze of radio parts made comparatively simple.

Projected Aids

All of the previously described training aids were used in huge quantities in all service training programs. The commonly held view regarding visual instruction, however, is that projected aids are peculiarly characteristic of military training. To a certain extent this view is well founded since the Army and Navy em-

ployed all types of projected aids found in civilian classrooms. In fact, by the end of the war no classroom would have been considered adequate without access to projectors. Opaque and still projectors, sound motion pictures, filmstrips, and slides were all used, although the use of slides was far less general than that of other projected aids.

A few experimental approaches to the employment of projected aids are sufficiently significant to merit brief consideration. One such experimental development was the Navy's visual-aid projector and vectograph equipment. This type of projector provided for classroom projection of photographs, drawings, charts, and silhouettes. The instructor could also animate the projected images by pointing or marking on a special transparent plate. This projector required the usual darkened room, although another innovation resulted in projection of positive negatives. By this method white lines are projected onto a blackboard, thus facilitating tracing of electrical circuits, for example.

Films

Even a casual examination of film catalogs of the Army and Navy reveals the extent to which visualization of training sequences was effected. By 1945 practically all significant subjects had films available with which to improve instruction. It has been estimated that the Army alone produced approximately 2,300 films and more than 1,500 filmstrips between the time of Pearl Harbor and the surrender on the *Missouri*. The Navy catalog for 1945 listed approximately 9,000 films from various sources as available to instructors in the Navy, Marine Corps, and Coast Guard. The catalog of the Army Air Forces similarly indicated availability of thousands of instructional films.

The armed services made an all-out effort to exploit the value of projected aids as well as to capitalize on the movie-going habit of the average serviceman. Projected aids were used for orientation, morale building, basic and technical instruction, instructor training, and for entertainment in leisure time. In short, an instructor in the Army or Navy in 1945 could generally not only find available some kind of projected aid suited to his pur-

poses, but he could use this aid since projectors were available in any school.

Auditory Devices

Auditory devices were used less extensively than most of the previously described training aids. In certain areas, however, their use was extensive and particularly appropriate. Recordings came to play a very important part in communications training since the learning of code and voice communication was especially facilitated by means of recordings. Magnetic tape or wire recorders likewise came to be quite significant as means of developing individual proficiency in Morse or voice codework.

In the more general aspects of training, auditory devices added reality to synthetic training devices. They also provided the sounds of military life, for example, shipboard calls, commands, or band music for marching or drills. Perhaps the most comprehensive adaptation of these devices was found in the teaching of foreign languages. Recordings, dictation machines, and tape recordings afforded students means of individual study of these languages. Considerable claims have been made that this use of auditory devices greatly shortened the time necessary for learning the language and resulted in greater proficiency than otherwise would have been possible.

PRODUCTION AND DISTRIBUTION

Availability of the instructional aids just described was directly dependent upon an efficient system of production and distribution. During the war, production of training aids tended more and more in the direction of centralization of responsibility, while distribution tended toward decentralization.

Local Production

In the early days of the war instructors in the Army and Navy had relatively few training aids upon which to rely for instructional improvement. As a consequence of this situation, much improvisation of teaching devices was characteristic of early training programs. Local schools, therefore, assumed leadership in procuring professional staffs, designing and constructing

training devices, and formulating programs for effective use of these aids. Prior to 1943 the major responsibility for utilization and production of training aids was a local duty since uniform and standardized aids were relatively meager.

Local ingenuity and initiative tended to merge into concentration of production facilities at various key schools. Gradually also training-aids officers began to be designated as a means of coordination of functions and also as a direct stimulation in local schools. With the evolution of these production programs in key schools, facilities were greatly enlarged, specialized personnel became available, and the influence of training aids assumed rapidly increasing significance. The scope of activities in one ordnance school demonstrates how similar schools evolved their programs. In this particular school the training aids branch included a photography department, an art department, a model shop, a silk-screen department, a training-film department, and a library department.

As the so-called key schools continued to experiment in production of teaching aids, their influence on similar training programs elsewhere assumed greater importance. Training activities headquarters continued the policy of stimulating this experimentation, but at the same time made provision for distribution of locally produced aids to many schools. Navy production and distribution always tended toward more centralization than was characteristic of the Army, but various Navy schools likewise produced many aids which later were centrally distributed to all appropriate training stations.

Central Production

As training problems became more complex with the building up of the Army and the Navy, the trend toward central production grew rapidly. The key schools then assumed the status of central production agencies for various arms of the service and other central training aids development centers were established. Especially in naval aviation was this centralization of responsibility early determined, for a training-film unit was already functioning in 1941. The Bureau of Naval Personnel established a center in 1942 for central production of prototypes

which were then given to commercial firms for mass production. By 1943 central control of production facilities had become the generally established pattern in both the Army and Navy.

Production of large and complex training devices, especially for aviation training, was from the beginning of the war a centralized function. Such devices were often the product of intensive research and experimentation into means of translating combat information into training by simulation of actual flight conditions. After working pilot models had been perfected by the special devices divisions, production of these complicated aids was finally taken over by commercial agencies.

Production of training films was similarly a centralized function. In their production a technical adviser, an educational consultant, and a project supervisor generally cooperated in developing the requested film. The script-writer visited the requesting agency to procure pertinent information and to familiarize himself with the proposed functions of the film. Additional technical information as required was secured from the appropriate source. The approved script was then filmed and test prints were sent to appropriate training activities for approval or modification. Upon final approval, initial distribution lists were made and publicity was given to the uses of the new film.

The sequence of steps involved in preparing strip films was much the same as that of motion pictures, except that local schools frequently provided most of the impetus for such production, as well as photographs and final framecards required to print the strip. Priority boards tended to scrutinize filmstrip requests less critically, since costs were smaller, facilities were more generally available, and the amount of film required was smaller. The specific purposes and data outlined in filmstrip requests also tended to show more clearly whether their production could be justified.

Distribution Agencies

At the beginning of the war, centrally produced training aids, primarily films, were distributed directly from agencies in the War and the Navy Departments. Central distribution proved

unsatisfactory, however, when demands for films began to increase rapidly in 1942. Distribution of films by the Navy in 1942, for example, increased from 2,000 prints in January to almost 50,000 in August. In the face of this rapidly mounting demand for films, in particular, and other kinds of training aids to a lesser extent, both Army and Navy training organizations established systems of decentralized distribution. To effect rapid and efficient distribution, libraries were organized in most training centers. "The right film at the right place at the right time" was the primary objective. By the beginning of 1944, training aids distribution systems were greatly facilitating getting into the classroom the vast array of films, strip films, and other standardized training aids.

UTILIZATION AND EFFECTIVENESS

One of the most influential factors that motivated the use of instructional aids was combat need. Both instructors and trainees felt that learning to use training aids was preparation for battle and hence their use was thought of as a means of perhaps eventually "saving your own skin." There were, of course, exceptions to this motivation, but most servicemen felt the constantly growing pressure to "be ready." Utilization of training materials, therefore, must always be considered in the light of this tendency of students to want to learn as well as the instructors' tendency to want them to learn. Training aids were then employed to cultivate a psychological readiness and to provide "more learning in less time" by simplifying, clarifying, and integrating the facts, principles, skills, and judgments which men needed if they were to perform their military duties.

From the beginning of the war, one basic assumption operating in naval training, as stated in the manuscript history of the Training Aids Division, Bureau of Naval Personnel, was that "the superior effectiveness of motion pictures, models, and other visual and aural devices had been well demonstrated in civilian education" and hence "their employment in the war situation became a matter of applying superior tools to the problem at hand."

Despite this condition of psychological stimulation and the

officially held doctrine regarding the importance of training aids, early surveys in both the Army and Navy revealed distribution and utilization of training films to be most unsatisfactory. For example, a survey of Navy schools in 1942 disclosed that half of the schools were using films poorly and a fourth were not using them at all. Among 7,000 instructors less than 30 percent were using any audio-visual aids. A similar Army survey also indicated inadequate use, but reported distribution to be the most serious problem. These surveys led to the earlier mentioned decentralization programs with establishment of central libraries in the various Army and Navy continental districts and at overseas bases.

The Training-Aids Officer

Establishment of these libraries could not alone guarantee efficient functioning or their efficient use by near-by schools, bases, or ships. It soon became apparent that official coordination through officers who had been trained in distribution and utilization procedures was essential to more effective use of training aids. Training-aids officers were eventually chosen and assigned to all headquarters training activities, districts, and local training stations. These staff officers were then responsible for coordination of the use of training aids, effective distribution, informal evaluation of effectiveness, stimulation of wider and more appropriate reliance on teaching aids, publicity regarding availability of all kinds of aids, and encouragement and direction of local production. In certain instances the training-aids officer was also in charge of supervision and curriculum improvement. Whatever the administrative plan, however, training-aids specialists cooperated in the general program for improvement of instruction.

A major influence in military use of instructional aids was the extensive program of supervision developed at practically all training centers. This supervision embraced both standardization of instructional guides and personal direction of in-service training programs. Throughout the war a steady trend toward standardization and uniformity in courses of study exerted a powerful influence on the reliance placed on training aids as well

as on determining what specific aids were employed in the classroom. As a general practice, training aids were at least suggested in instructional guides, and in many instances, were specifically listed as required. Any failures to employ training aids were pointed out and promptly rectified. At least by 1944 the program of supervision was operating in most service schools, consequently supervisory and inspection reports influenced considerably the development, distribution, and utilization of training aids.

Extent of Use

Records, reports, surveys, and official training histories document the popular assumption that all kinds of training aids were used in service schools in record-breaking quantities. From the simple hand-blinker used for code practice to the most expensive and elaborate special device, quantitative utilization increased dramatically from 1942 to 1945. In film showing, for example, the military services probably did more than twice the business in 1943-45 that the motion picture industry had done for the entire country before the war. Army and Navy surveys of training-aids usage in 1944 and 1945 disclosed conditions radically different from those of 1942. On the later surveys, data on extent of use demonstrated conclusively that utilization techniques and supervisory programs had resulted in reliance upon films, graphics, and other kinds of teaching aids by practically every instructor in military classrooms. Thus it is undoubtedly true that military use of training aids far exceeded any past or present civilian usage of such audio-visual devices.

Research data on effectiveness of the use of audio-visual aids are extremely meager, and thus a report on their effectiveness is predicated on empirical approaches. Extensive research programs were planned in both the Army and Navy, but only a few were actually executed. Evidently the previously accepted value of all kinds of training aids exercised restraint upon the establishment of elaborate research programs. It was also difficult to justify the use of resources and personnel for carrying out planned research while military leaders considered winning the war the paramount objective.

Another influence operating to prevent large-scale research into the effectiveness of training aids was the *planned* production of almost all these aids. Extensive research and planning generally went into such production and thus considerable reliance was placed upon the validity of these aids even before they were supplied the instructor. In most instances production came in response to actual and urgent instructional problems, therefore there existed what may be called a "face validity" even before utilization.

The studies that were reviewed support the contention that films can and do affect emotional attitudes in whatever direction the producer predetermines to be desirable. Furthermore, such attitudes tend to persist for a considerable time. Films also definitely increase factual knowledge and such knowledge also tends to remain longer than that obtained from reading alone. Studies of the use of filmstrips reveal that instructors tend to indicate approval of their importance, but do not use them as successfully or as often as films.

Surveys and studies in the armed services have shown that personal instruction increases the learning value of films and that audience participation in filmstrip showings increases the amount of factual knowledge that is retained. This increase in factual knowledge seems to be especially significant in regard to difficult material that is handled by groups having low motivation, and by groups of average and low intelligence.

Research studies concerning the effectiveness of special devices permit no general conclusions. Some devices were clearly helpful in training, while others had doubtful or negative values. Tentative conclusions are that a device must be considered an aid and not a teaching device itself; training on actual equipment is preferable to training on devices in some cases; transfer of training from one device to another occurs only when the two devices are much alike.

Opinions of Instructors and Trainees

All studies indicate general approval of extensive employment of training aids. Certain studies suggest that trainees prefer greater emphasis on demonstrations and actual operation of

equipment rather than excessive use of training aids, and that practically all instructors prefer motion pictures to filmstrips. Instructors are further convinced that motion pictures and filmstrips do shorten training time, result in greater learning, and stimulate interest and motivation. Questionnaires filled out by veterans enrolled in colleges and high schools indicate an overwhelming endorsement of greater use of audio-visual aids in civilian educational programs.

LESSONS FOR CIVILIAN EDUCATION

One result of the survey of armed services training aids programs is the realization that the highly popularized military use of these aids was not an innovation in American education. The armed services did extend the utilization of multisensory aids far beyond that characteristic of civilian schools prior to the war. Implications of this aspect of military education must be derived primarily, therefore, from the extent of use and varieties of training aids, relatively new purposes projected for such devices, techniques of use employed by military instructors, and certain administrative and distributive practices.

1. *Multisensory Aids at All Levels of Education*

The one dominant feature of the survey of training-aids programs is the disclosure that practically all varieties of training aids and devices were used at every level of military training. The inductee was immediately confronted with "do's" and "don't's" portrayed by means of visual media. In the succeeding formal training period every conceivable subject was visualized and dramatized. Such aids likewise predominated in advanced military schools intended to develop technical and professional competence. Without doubt, training aids and devices were more extensively utilized than has previously been true of any other large-scale educational venture.

The mere fact of extensive use of audio-visual aids by the military does not *per se* indicate the desirability of more widespread use in civilian education. There were, of course, illustrations of the development of passivity in students, indications that some instruction had a canned quality, and examples of the fact

that overuse and excessive reliance upon training aids did at times occur. The over-all conclusion, however, is clear, namely, that military use of training aids was both necessary and effective.

One method of instructional improvement in civilian education is a similar wise utilization of a variety of aids to facilitate learning, broaden pupil experiences, and enrich teaching and learning at all levels of education. The good teacher has, of course, already exploited multisensory learning aids; the less effective teacher should adopt an experimental attitude. The drab and uninteresting classroom can take on new life; routine teaching and learning can become more challenging and dynamic in meeting the needs of children and youth.

2. Effective Use of Training Aids

Utilization surveys in the Army and Navy repeatedly emphasized the fact that mere availability of instructional materials does not assure effective use. Particularly in the early days of the war, failure to use audio-visual materials was generally characteristic of military instruction. Lack of understanding of the proper functions of training aids in classroom situations, insufficient acquaintance by instructors with available materials, and lack of previous education for teaching often resulted in uncertainty and hesitation. As a consequence of this somewhat chaotic condition, deliberate efforts were later made to "sell" the instructor on the importance of films and other aids, and definitely planned in-service training programs were set up.

Judicious use of multisensory aids in civilian education should likewise be based upon more studies by local and state groups of the current status of such aids in the system; availability of films, graphics, and other aids; functions which these aids can and should serve in the educational system; facilities necessitated in local education systems; and actual needs for these aids as recognized by the instructional staff. Such studies should make possible a continuous development of any use of audio-visual media and thus provide the progressive evolution essential to success. Without such systematic and gradual development, multisensory aids can be popularly interpreted as a revolutionary and magical means of quick education. The inevitable concomitant of such

views is retrogression and loss of faith in audio-visual devices and a consequent lessening of lay and professional enthusiasm.

3. *Purpose of Audio-Visual Aids*

Multisensory aids to learning should be conceived as aids rather than as self-contained teaching devices. Official statements of training doctrine in the armed services consistently emphasized the point of view that all kinds of training aids should be used as *aids* and not as *teachers*, and should be integrated into a *planned* training program. Undue reliance upon multisensory aids did occur at times, however, with the result that artificial or make-believe situations developed. Especially in the early years of the war it was at times necessary to substitute dummies for the real thing because of critical shortages of equipment. This substitution for reality undoubtedly occurred in some classrooms even beyond the time when equipment became generally available for instructional purposes. Certain classrooms also presented at times a confusing array of gadgets and devices which resulted in the distraction of the learner. It should be reiterated, however, that official doctrine encouraged wise and discriminating use of training aids rather than undue reliance upon their effectiveness.

Proper employment of multisensory aids in civilian education must likewise rest upon a clear conception of the functions of these materials in the classroom. Availability of elaborately prepared and technically accurate graphics and films does not assure that desirable learning will result. The most important outcomes should be greater enrichment of the curriculum, development of significant understandings, a broadening of the scope of learning, and provision of greater opportunity for individual growth. No type of aid can replace reality in teaching; the real things should still be dominant in the classroom. The teacher who recognizes both the limitations and capabilities of multisensory aids should then capitalize upon their potentialities.

4. *Effect of Local Ingenuity and Initiative*

Local initiative was especially characteristic of military instruction in the early years of the war. Instructors without

adequate equipment devised and used substitutes; inexpensive and salvageable materials became resources for the development of teaching aids. Development of military training programs resulted eventually in provision of standardized training aids in huge quantities with a consequent lessening of locally prepared materials. Despite this trend toward standardization, however, locally prepared charts, mockups, models, maps, posters, and demonstration panels constituted a significant addition to centrally produced and distributed aids.

Local ingenuity and creativity have been characteristic of thousands of schools in American education. At the same time, however, other schools have displayed a tendency to wait for state or local administrative agencies to supply commercially prepared charts, films, maps, and devices. Many highly effective audio-visual aids cannot be produced in the classroom; without financial resources other than those now available to vast numbers of schools, audio-visual aids programs will be handicapped. Nevertheless, military and civilian educational experiences have shown conclusively that the creative teacher with proper leadership can devise, substitute, create, and make available learning aids that are often as effective as expensive and elaborately designed devices.

5. Use in General Education

Multisensory aids to learning should be employed in general education as well as in technical and vocational training. Armed services experimentation with general education was limited in scope. Perhaps the most effective illustration of this type of venture is the deliberate attempt by both the Army and Navy to instill certain predetermined attitudes into every man in uniform. From the military point of view, it was essential that servicemen possess generally common attitudes and emotional outlooks. High morale was a prerequisite to military success; doubts and misgivings could foredoom a military venture.

To achieve this general sense of significance, personal worth, and importance, practically all media of the audio-visual field were exploited. Films were, without doubt, the most effective means used, and much informal indoctrination resulted from

employment of posters, maps, charts, and cartoons. The *Why We Fight* series of films was probably the most successful single technique for development of these common attitudes. The over-all effectiveness of this approach to what may be termed general education must be appraised primarily in the light of empirical judgments and subjective evaluations. In general, however, the conclusion is inescapable that the Army and Navy training programs were successful in developing the desired behavior patterns.

Civilian educational institutions have relied to some extent upon the use of audio-visual techniques in the areas of general education. In the prewar period, however, a prevalent attitude among many teachers and administrators was that audio-visual techniques were more adaptable to vocational and technical training than to general education. The Motion Picture Project sponsored by the American Council on Education contributed significantly to an understanding of the potentialities of films in the area of general education. Yet the summary report on this project indicated that in the use of motion pictures in education the surface has hardly been scratched. Military experience substantiates the effectiveness and importance of audio-visual materials in general education; specific references on appropriate use are, however, generally nonexistent.

Perhaps one caution should be offered regarding the exploitation of audio-visual media in the area of human relations and action. Service employment of these materials was designed to produce specific attitudes and elicit militarily acceptable responses. The motivation was for one accomplishment—destruction of the enemy. The implication of this condition with respect to civilian education is clear: films and similar teaching aids can produce almost any desired responses, predispose men to almost any course of action, alter basic attitudes in a short period of time, and motivate men to hitherto unacceptable modes of behavior. Drama, suspense, propaganda, adventure, sympathy, intense emotional feelings, and desire for action are all inherent within audio-visual aids. Military use of these media was affected by the potential evil as well as good inherent within the media.

Civilian education must be cognizant of the potentialities of films and similar aids for both good and bad outcomes.

6. *Widening of Experience*

Multisensory aids afford a dynamic means for extension of vicarious learning. As suggested in other implications, service training programs attempted to approach reality as completely as possible. Military maneuvers with live ammunition and abandoning ship in the swimming pool are representative of efforts to give a sense of realism to training. In certain areas of training, however, only an approach to actuality was possible. In these areas audio-visual devices played a major role; they made it possible for the trainee to sense the nature of the real thing. Poisonous gas sniff-kits, recordings of battle noises, terrain models, posters, pictures, and maps of every country were all effectively employed in this provision of training experiences designed to orient trainees to the real tasks ahead.

In civilian education such learning aids can likewise open new vistas of experiences, broaden the horizons of children and youth, and motivate serious study of personal and social problems. In addition, such aids can bring the remote near, visualize the invisible, lend a sense of reality to academic situations, point the way to curriculum improvement, stimulate broadened interests and purposes, and assist in bridging the chasm between much of school life and the world outside. With judicious use of films, recordings, and graphics the whole world, in effect, becomes subject-matter content.

7. *Need for Training in Use of Training Aids*

The effective utilization of multisensory aids necessitates both pre-service and in-service education in the use of such aids. Records of service training demonstrate conclusively that production and distribution alone do not eventuate in effective utilization of training aids. Extensive reliance upon audio-visual devices, generally associated in the public view with military training, was not characteristic of service programs in the early years of the war. Apathy, indifference, lack of training, and even hostility by certain instructors tended to jeopardize the training

aids programs of the Army and the Navy. Directors of training soon realized that it was necessary to popularize films and graphics and to train instructors formally in the proper use of such aids. By 1945 practically every military instructor had received either formal or informal training in how to use training aids effectively, and consequently surveys revealed a much greater degree of instructor assurance and confidence than was found in the first year of the war.

Similar utilization problems have been and will be confronted at all levels of civilian education. Appropriation of large sums of money for films and slides and appointment of audio-visual specialists or supervisors will not automatically effect curriculum improvement. The most important person in education is the classroom teacher; lacking an intelligent appreciation and insight into the proper employment of audio-visual devices, the teacher may use films, graphics, and slides merely for entertainment and time-killing. Thus it becomes imperative that prospective teachers have experiences in and training for the use of all varieties of educational aids. Similarly, programs of in-service education should take cognizance of the needs of teachers for experience and instruction in classroom use of audio-visual materials.

8. *Aids in Developing Common Abilities*

The use of multisensory aids affords a means of fitting instruction to individual differences. Armed services personnel were a cross section of American society, and the potentialities of the various members of a group of basic or "boot" trainees varied tremendously. Military training programs were planned on the assumption that visual and auditory techniques afforded reasonably reliable and practicable methods of developing common understandings, attitudes, and abilities. Trainees with insufficient ability or interest to profit greatly from verbalizations could "see," and "hear," and then "do" the required military assignments.

Judicious and skillful employment of multisensory aids undoubtedly results in considerable lessening of the difficulties encountered as a result of wide ranges in ability among pupils.

Such use will not, and should not, eliminate individual differences; but should enhance the value of such variables. Appeal to all the senses gives confidence to some pupils who feel inferior when verbalizations are employed. Use of these aids should result in a more balanced educational program, in provision of experiences in which all pupils may share with a feeling of success, and in motivation of accomplishment by the least gifted as well as the most gifted.

9. Continuous Surveys of Training Aids

Local, regional, and national surveys are needed periodically to determine current uses of available teaching aids, needs for new aids, and methods of facilitating production and distribution of these aids. Whether in individual service schools or at headquarters, almost every director of military training eventually established a division or section to conduct surveys of production, distribution, and utilization. This fact in itself suggests the extent of reliance upon training aids by the armed services and also that civilian education must have comparable surveys if potential values of audio-visual aids are to be realized. Certainly many civilian teachers and administrators are currently in a position comparable to that of many service instructors and supervisors in 1941-43, that is, they are confused about the possibilities of multisensory methods and they lack information as to the teaching aids now available as well as effective methods of using them.

The implication is then that local, state, or regional educational agencies should assume the function of surveying uses of educational aids and facilitating production and distribution of such aids in accordance with known instructional needs. Undoubtedly numerous commercially prepared films in the prewar years tended to be too logical, general, and often unsuited to the needs of the classroom teacher. In addition, it was, and still is, often impossible to secure a film or other aid at the time its use could be related to the instructional program. In many instances, too, the administrator and teacher need a careful and objective rating or appraisal of films and slides in order that meaningful choices can be made. These various functions could

perhaps best be performed by state, regional, and national groups on the basis of continuous local surveys.

CONCLUSION

In conclusion, the over-all implication of the training-aids programs of the armed services is that civilian educational leaders should reappraise the functions of multisensory aids in instructional improvement. Such appraisals must also be undertaken in the context of the whole educational program. Training aids do not afford the answers to educational problems as certain popular armchair educators might imply. But neither will a lackadaisical or indifferent attitude result in capitalization upon the demonstrated potentialities of films, graphics, or other audio-visual approaches. Enthusiasm combined with sensible realism should eventuate in constant experimentation with newer approaches to improvement of the curriculum of American schools.

X. INSTRUCTIONAL MATERIALS: SPECIAL TEXTBOOKS AND MANUALS

IN October 1945 the Adjutant General issued a list of War Department publications which contained 20,000 items. This list included only a part of the books used by the Army Air Forces and none of those published by the Army Service Forces. The total number of books and pamphlets issued by the various commands of the Army has been estimated at 40,000. The official indexes of Navy publications list 18,000 books and pamphlets, and in addition to these, there was an undetermined number of pamphlets which had been prepared by activities such as naval training schools and special training centers in navy yards and repair bases. These training materials were intended to meet quickly and cheaply a special local need not covered by over-all publication programs.

The entire list of publications leaves few areas of human endeavor unmentioned. As an example of the subjects covered, a small block of entries under the letter "M" from the list and index of War Department publications shows: machine guns, machine records, machinery, machines, magnetos, mail, maintenance, malaria, management, maneuvers, manpower, mapping, marking, marriage, marksmanship, massage, materials, mathematics, meals, meats and meat products (inspection of), mechanical drawing, mechanism, medal for merit, medicine. While many of the publications under these groupings consist of regulations, circulars, and memoranda having no explicit bearing upon training as such, yet all are for the information and guidance of service personnel, and in that sense are instructional materials.

During the five-year period between 1937 and 1941, commercial book publishers produced about 10,000 new titles each year, with only about ten publishers individually producing more than 300 new titles annually. In contrast to the 50,000 new titles published commercially in the five years before Pearl Harbor, the armed services issued an estimated 80,000 new titles and reprints during the war years. This total put the armed services in the category of big-time publishers.

TYPES OF PUBLICATIONS

The armed services were interested chiefly in the preparation of nonfiction, consisting of (1) serial and collated regulations and directives currently having the force of administrative law; (2) training materials such as textbooks, manuals, and reference books; and (3) exhortative or inspirational materials. Fiction and other nonfiction were furnished to all branches of the services for recreational use from the lists of commercial publishers, and the preparation of such manuscripts was not the job of the armed services.

In the field of inspirational or exhortative materials, examples include pamphlets urging military personnel to buy national service life insurance. Those used to explain the rates and manner of purchasing such insurance came under the general group of teaching materials. But there were publications intended to persuade the doubter that he should buy government-issued insurance for his own peace of mind and the good of his family, and many of these pamphlets were outstanding.

Textbooks were classified into two groups: (1) those for individual training and (2) those for team training. Manuals included publications which served specific equipment. This type of book tells what the equipment is and what it is intended for, how it should be operated, the care of it, and how to make at least minor repairs.

In contrast to the training for war, the peacetime education systems of the Army and the Navy have been characterized as leisurely, but the overnight increase in the number of trainees caused a corresponding need for training materials. Textbooks available were inadequate both in quality and content.

In many subjects required in the training for war no textbooks existed. For example, a knowledge of the manners and customs of Iran was needed for personnel assigned to duty there. There was no guide suitable for this. In some fields of scientific research, such as radar, the war cut down the normal period between the birth of an idea and the manufacture of equipment based on that idea. Before the war started there were no manuals in these fields. After the war started,

none could be written commercially because the armed services placed a security classification on most of the subjects.

PUBLISHING FACILITIES IN THE ARMED SERVICES

The armed services faced the problem of finding personnel trained in writing, editing, styling, proofreading, and manufacture of books and pamphlets. Theoretically, the problem of manufacture was met by the Government Printing Office, but after the GPO had expanded to its limit and then subcontracted work, many special jobs had to be contracted for and supervised.

To meet the need for written materials, publication groups began to appear on organization charts. The general plan of organization was similar to that of a commercial publisher of books, except that in the armed services the staff usually included the writers who served as the anonymous authors. Among the writers of these staffs were authors of standard textbooks, fiction writers, newspaper reporters, editors, and copyreaders. Writers took the plans and ground out copy with the speed and precision of a production line.

Many manufacturers of equipment had publication sections that had functioned before the war. It is customary for a commercial concern to take some responsibility for telling the consumer how to use and maintain the equipment it sells, and the conversion of manufacturers' publication facilities to wartime needs was comparatively easy.

In peacetime an enlisted man had relatively ample time to become acquainted with a piece of equipment. His book of instructions on any equipment was supplemented by help from more experienced men. Changes in equipment were made infrequently. Under the wartime plan, however, this was all changed—men had to be prepared to act quickly and independently in the case of an emergency. It was sometimes necessary to depend upon a publication to furnish knowledge of equipment which would usually be gained by actually working on it. This situation arose when manufacturing or logistics were not on schedule and men were being trained where not enough available pieces of equipment were on hand.

During the war, changes in equipment frequently were made to combat more efficiently the weapons of the enemy and to improve our offensive warfare. Knowledge of these modifications had to be disseminated as quickly as possible.

Commercial organizations began to offer their services as writing, editing, and production staffs. Some of these firms were advertising agencies who found that their peacetime accounts had become less active. Other firms grew up in response to the need for these services, and many groups were set up to produce a complete printed book by subcontracting part of the work.

SOME CHARACTERISTICS OF ARMED SERVICES MANUALS

The potential audience for the text shown in Figure 5 should be persons who have completed the seventh or eighth grade. Since the book was written for the student gunner's mate, the style is suitable. Gunner's mates were chosen from among high school graduates, if possible, but they had to master subject matter considerably more difficult than basic hydraulics before they could qualify.

Figure 6 rates difficulty or suitability for a potential audience of those who have completed high school or some college. Since the text covers data that are difficult to explain, a further attempt to clarify it is made through a pictorial illustration. The running caption which accompanies the illustration reads "easy" or suitable for a potential audience of those who have completed the fifth grade. The simple illustration based on a familiar experience serves to temper the difficult text.

Figure 7 rates "fairly easy" or suitable for a potential audience of those who have completed the sixth grade. This sample represents a characteristic of many of the outstanding publications of the armed services—a light touch. In Figure 7 this is accomplished with no loss of accuracy, directness, or organization. The cartoon has attention value, the numbered rules are a spur to memorizing.

The majority of books examined show a conscious attempt to furnish motivation and to use a psychological approach where

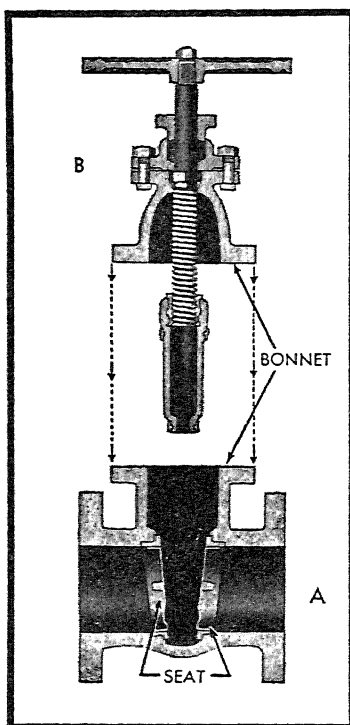


Figure 78

valve, and the stem to which the gate and the hand wheel are attached. When the valve is open, the gate stands up inside the bonnet, its bottom flush with the wall of the pipe. When the valve is closed, the gate blocks flow by standing straight across the pipe, where it rests firmly against two seats extending clear around the pipe.

Gate valves permit straight flow and offer little or no resistance to the liquid when the valve is completely open. Although they are often left partly open to throttle flow, they are intended for all-or-nothing-at-all use. If the valve is left partly open its face may be eroded, since it will stand in the line of flow, where liquid can act upon it. Gate valves are not easy to open or close if the pressure is high.

The gate of the valve can be a solid or a hollow wedge, or it can be made out of two facing disks. The wedge type is satisfactory for smaller valves under low pressure, although wedges are sometimes difficult to get tight and will leak when worn. By using disks a better closure can be provided, since the disks can be forced apart, snug against the valve seats, as they are moved into position. One arrangement for doing this is shown in Figure 79. One of the two facing disks composing the valve has been removed to show how the valve is constructed. Two cams with arms extending outward stand opposite each other on slanting surfaces in the space between the disks. As the disks move into position the arm of each cam engages a lug on the body of the valve and is turned on

the slanting cam bearing surface, forcing the disks against the valve gates during closure.

Gate valves are made with three types of stem connections. In Figure 80 the stem screws down into the valve gate as the valve is opened. In this type the stem does not rise or fall outside the body of the valve as the valve is opened or closed. In Figure 81, the stem rises outside the valve as the valve is opened, but the stem screw operates inside the body of the valve. In Figure 82, the stem screw operates at the level of the hand wheel, so that the stem rises independently of the wheel as the valve is opened. This is called the outside-screw-and-yoke type of valve.

Valves with rising stems are used when it is important to know by immediate inspection whether a valve is open or closed. This is the case, for example, in automatic sprinkler systems, where valves are

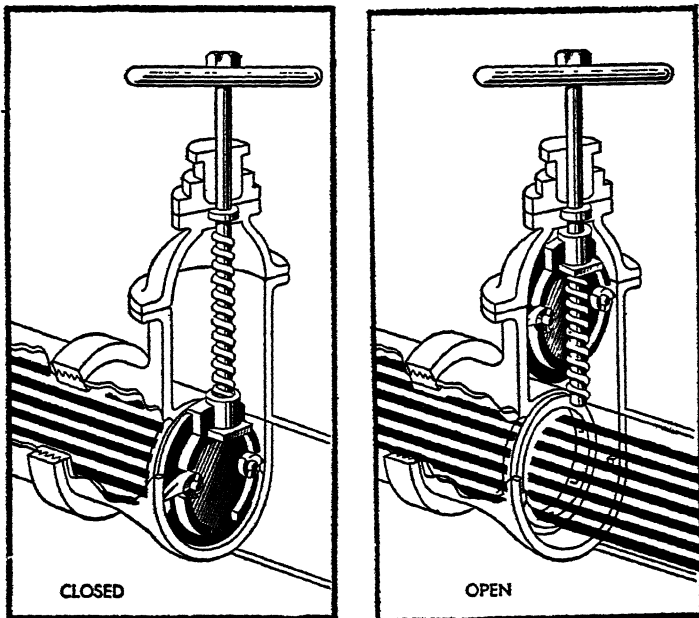


Figure 79



FIG. 5.—Sample pages (slightly reduced) from a Navy technical manual describing and illustrating a disk-type gate valve. The above double-page spread is reproduced from *Basic Hydraulics*, NavPers 16193 (Washington: Bureau of Naval Personnel, Standards and Curriculum Division, 1945), pp. 98-99.

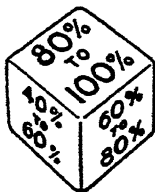
The table reveals that 6 out of 100 of the small patterns may be expected to miss completely, while only one out of 100 large patterns may be expected to place fewer than 5 per cent of its bombs within the 1000-foot circle. There is not only this apparent advantage for the large pattern of minimizing the possibility of complete misses, but another apparent advantage in that 77 out of 100, or over three quarters, of such patterns can be expected to place 20 to 25 per cent of their bombs in the 1000-foot circle, so that very high assurance is given a single attack. But these advantages disappear if more than one attack is considered. A comparison of the average per cents for the two types of patterns discloses that the small pattern places nearly twice the percentage of the large pattern within the target circle. This is a comparison important for commanders to remember. It means that a pattern which may miss the target more often than another pattern may yet make for better bombing.



Formation bombing necessarily yields results fluctuating more widely than those of attacks by single aircraft because the technique affords a smaller number of aimings. That the fluctuations can be predicted, however, is demonstrated by comparison of results which could be predicted for 100 consecutive normal aimings of Eighth Air Force patterns dropped early in 1944 with the actual results.

Per Cent of Bombs within 500 Feet of Aiming Point	100 Eighth Air Force Patterns	Predicted Results with Pattern 1,800 Feet Square Cep Equals 875 Feet
over 25%	24	20
20-25%	12	17
15-20%	14	13
10-15%	13	12
5-10%	16	11
0-5%	10	13
0%	11	14
	<u>100</u>	<u>100</u>

The variation in result from none to a very high percentage of bombs within 1000 feet of the aiming point is largely overcome if several formations are sent over the target. Attack by even as few as four formations greatly stabilizes results, as is shown by the following table.

One die  is cast 
all throws from 1 to 6 are equally probable.



Four dice 
are cast 

throws cluster around 14—values as low as 4 or as high as 24 come up seldom.

Four formations go over the target.
Results average 42 per cent strikes in the target circle. Four patterns missing or four scoring in the top bracket are unlikely.

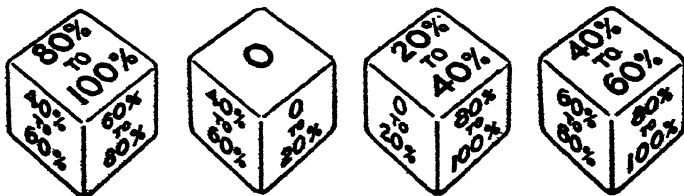


Figure 8. Bet on averages

FIG. 6.—Sample pages (slightly reduced) from an Army manual describing and illustrating probability of hits in formation bombing. From *How to Improve Formation Bombing*, Air Forces Manual No. 67 (Washington: Headquarters, Army Air Forces, 1945), pp. 14–15.



☆ **If you ever expect to tell your grandchildren about your flying career, remember these 15 rules**

☆

☆ **Here they are...**

1. Maintain your flying speed!
2. If freezing temperatures exist--be on the alert to detect ice when flying through clouds.
3. Turn on pilot heat in anticipation of moisture, regardless of outside temperature.
4. De-ice the propeller in anticipation of ice and keep the de-icers operating while in icing conditions.
5. If the de-icer fails to clear the propeller, increase your R.P.M. periodically.
6. If you have ice, land under power. Fly the ship on.
7. If you are taking impact ice, move the throttle occasionally.

26

8. When moisture is present, keep the carburetor temperature above freezing to prevent icing if loss in manifold pressure occurs.
9. Clean water, frost, and snow off your plane *before you take off*.
10. Hold seaplane taxiing down to a minimum under freezing temperatures.
11. When you run into wet, sticky snow, climb above it.
12. Avoid turbulent areas -- fly above or below clouds, if possible.
13. When necessary to fly in icing clouds, seek temperatures under 15° F., if possible.
14. If you have to go through an ice region, go through as fast as you can.

15. **MAINTAIN YOUR FLYING SPEED!**

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FIG. 7.—Sample pages (slightly reduced) showing use of humor and graphic illustration to point up lessons on how to fly safely in icing conditions. From *Ice Formation on Aircraft*, Aerology Series No. 1 (Washington: Training Division, Bureau of Aeronautics, USN), pp. 26-27.

this was possible. It was apparent that material had been organized into clear outlines and developed through well-planned paragraphs and sections. The use of standard end-of-chapter questions was customary.

SOME LESSONS FOR CIVILIAN EDUCATION

Ideas that had been developed experimentally often served as the cornerstone for progress along more general lines. It has been utterly impossible in this brief summary chapter to do justice to the excellent publication work of the Army and the Navy. As a matter of fact, a careful review of fifty selected items indicates that textbook publishers would do well to investigate more closely the pioneering ideas contained therein.

Doubtless, many of the ideas which have proved to be so successful in educational programs in the armed services will be adapted to use in solving the somewhat different and less clear-cut problems of peacetime education. In any adaptation, emphasis in the armed services on memory rather than reasoning will require consideration. Among effective characteristics illustrated in the publications of the Army and Navy are: (1) well-organized numbered lists of important points, (2) devices for calling attention to these lists, such as display type, tint blocks, colored or black borders, conspicuous display on the page, (3) glossaries, (4) well-planned illustrations of important facts, (5) captions, (6) cartoons, (7) well-planned page layouts making the organization of data easy to grasp.

Part Four

SELECTED SPECIAL PROGRAMS

SELECTED SPECIAL PROGRAMS

1. The armed services operated varied and popular, voluntary off-duty educational programs, including library services, correspondence instruction, discussion groups, news distribution through service newspapers, maps, exhibits, and motion pictures, and a system of Army post-hostilities schools and universities in Europe and the Orient. These activities maintained morale by keeping contacts with cultural facilities. They suggest many possibilities for civilian adult education on an unprecedented scale.

2. The training of civilians for work in the war effort through various agencies afforded many inspiring examples of what can be done by a great free people when moved by a unity of national purpose.

3. Some 300,000 women served as members of the armed services and were trained for hundreds of duties ranging from hospital work to pilot training, and from clerical work to military command and administration. Outworn prejudices regarding the ability of women were changed by experience, ushering in wider possibilities in the future education of women.

4. The armed services undertook to develop qualities of leadership in instructors and trainees by stressing the fundamentals of good presentation. They provided instructors with short and intensive pre-service and in-service training, including frequent refresher courses, often involving travel, at no personal expense and with no interruption of pay. These practices commend themselves for wider use in American schools of all types.

5. The backbone of armed services training in a technological war was technical in character. It was accomplished by tightly organized short and intensive courses arranged in sequences to produce the required numbers of graduates possessing the required skills. It offers an excellent object lesson for specific vocational education in civil life, both in schools and in industry.

6. Armed services training in wartime added enormously to the national reservoir of technical skills, and although these skills were taught and acquired strictly for military purposes, a large part of them can be converted to civilian uses. Both industry and the schools should devise ways to conserve, develop, and build upon these skills.

XI. OFF-DUTY STUDY: IMPLICATIONS FOR ADULT EDUCATION

BOOKS, magazines, and entire libraries went to war with America's fighting men. Half a million books were purchased by the Army Library Service for the convoy ships which carried the North African invasion forces. For the Army alone, congressional appropriations for reading materials were about \$1 a year per man, and for the Army alone this amounted to \$2,842,000 for continental service and \$8,417,000 for overseas service for the single fiscal year 1945. The library was the heart of the entire program of off-duty education, and the lessons for civilian programs are many.

The average age of the men and women in the armed services was less than that for the population as a whole, and participants in off-duty educational activities varied in this respect from students in civilian adult education programs. Nonetheless, the Army and Navy programs were basically adult educational in character. Maturity is not alone a matter of chronological age, and the armed services personnel were forced by the conditions they faced to become old beyond their years.

THE THEORY AND THE AGENCIES IN THE SERVICES

A broad conception of adult education views it as necessarily varied, diffuse, pervasive, and conducted through a variety of agencies. This was true in the armed services.

It also came to be understood that off-duty educational activities of the services were essential in maintaining high morale and in counteracting the boredom inseparable from long tours of duty at sea or in remote garrisons. They were a connecting link with the cultural facilities the fighting men had known at home. What the armed services did for adult general education in time of war on a vast scale suggests what can be done in time of peace on a vaster scale for the advancement of the American culture of the future.

The principles to be stated in this chapter grow out of the experience of the Army and Navy library services, the United

States Armed Forces Institute, the activities of Army information and education and Navy educational services sections, the programs of special training for functional illiterates in both services, the Army post-hostilities schools, and a variety of other related undertakings.

Library Services

Wherever the armed forces went, they were accompanied by their own library services, with stocks of technical, general, and recreational reading matter in charge of trained and devoted librarians at every major establishment. Army and Navy hospitals received special attention, because the therapeutic value of a good library service was recognized as a means of promoting convalescence. Sailors, aboard ship, had libraries stocked with a minimum selection of one book per man. Marines in inactive theaters had available a wide range of books on technical subjects provided by the Navy Library Section. Supplies of new books were augmented with large numbers of volumes contributed by the home front in Victory Book Campaigns. A notable contribution was the provision by the Council on Books in Wartime of the popular reprints of current books known as Armed Forces Editions.

The United States Armed Forces Institute

The well-known USAFI, successor early in the war to the Army Institute, soon became a joint concern of the Army and the Navy, and provided correspondence courses, university extension courses, study materials, lessons service, testing service, and accreditation service to members of both services. By mid-1945 it had a total of about 866,000 correspondence students, of whom about 575,000 were in the Army. Generally about 35 percent of its enrollees were Navy men during the last years of the war. About 10 percent of all registrants completed the courses they undertook, and late in the war they were encouraged to apply to civilian institutions for accreditation of this work. Of the first 7,000 who applied for high school credit, 98 percent received some credit, with 28 percent being awarded high school diplomas.

Out of every hundred who applied for college credit, 95 received some credit, and 20 were awarded college diplomas.

Considering locally organized classes in the services, which became a part of the USAFI picture, it is estimated that more than 2,000,000 members of the armed services made use of the USAFI study materials. Individual enrollments in correspondence courses and self-teaching courses in all the armed services reached an accumulative total of more than 1,250,000.

The Army Information and Education Division

After many successive changes in organization and nomenclature, the Army's top agency of orientation and informal education received this designation in 1944, and its officers in camp and field in face-to-face daily work with the soldiers came steadily to be better selected and better trained and to have a more clear-cut position in the local staff hierarchies. The duties of each information and education officer assigned to a station or unit included: (1) maintenance of a war information center containing maps and graphic displays, and one hour a week during duty time of lecture and discussion of the news and the topic of the week with military personnel; (2) analysis of educational needs, enrollment of individuals in USAFI courses, supervision of individual and group study, and arrangement for accreditation; and (3) cooperation with the Army librarian and with other agencies of informal education in publicizing the information and education program to the troops and introducing its methods and materials to other officers.

The Navy Educational Services Section

In the Navy the establishment of voluntary education centers at shore stations proceeded somewhat more slowly than in the Army, owing to the fact that a directive of 1943 made the matter dependent upon the request of the local commander. The general concept of the function was similar to that of the Army, however, and in mid-1945 a new directive contemplated a great extension of the work through the placing of educational services officers at all naval stations having 2,000 or more personnel, and eventually aboard battleships and aircraft carriers. The

Navy participated in the activities of the United States Armed Forces Institute from the time it started, and had its proportionate share of registered voluntary students. A popular informational periodical published by the Welfare Activity of the Bureau of Naval Personnel, at first limited to news concerning the Navy alone, broadened rapidly in both concept and circulation during the war and eventually reached a peak circulation of 390,000 a month under the name of *All Hands*. The Navy also conducted a war orientation program at its educational services centers, similar in tone and objective to the Army programs, and using some of the same materials such as the well-known *Newsmaps*.

Education of Illiterate Inductees

The armed services, after rejecting more than 200,000 men of draft age because of illiteracy alone, eventually inducted about twice that number who had never reached the fourth-grade standard of literacy. A large percentage of them was brought up to or beyond that level over a period of two to three months by means of intensive education in a system of "special training schools" where the teaching of the three R's to adults was accomplished speedily.

The Army Post-Hostilities Schools

Anticipating the cessation of fighting in Europe early in 1945, and recognizing that the use of soldiers' time pending either demobilization or redeployment to the Asiatic theater presented both a problem and an opportunity, the War Department prepared in advance for an extensive system of unit schools to offer instruction of elementary and secondary grade, central technical schools to offer vocational courses, and Army university centers. It is estimated that during the year following VE Day approximately 2,000 unit schools had an accumulated total enrollment of about a half million soldiers.

The most notable technical school center was at Warton, England, though others were established later in the Far East. Army universities functioned during approximately the latter half of 1945 at Shrivenham in England, Biarritz in France, and Florence in Italy. The unexpected early defeat of Japan and

the consequent urgency of demobilization cut the program short, but some 35,000 soldiers had the experience of an eight-week term at one of the Army universities in Europe, with many distinguished civilian professors brought over from the United States and other qualified instructors selected from Army personnel. During the demobilization period somewhat similar Army educational centers were also set up at various points in the Pacific area.

MEANINGS FOR THE FUTURE OF ADULT LEARNING

A large number of service people have been introduced to education as part of their adult experience and will be motivated to continue learning if opportunities are open to them. Adults who have become accustomed to the idea of learning will not consider it strange to go on doing so. Many have discovered new interests which they will wish to continue to explore. It is very clearly indicated, therefore, that civilian adult educational institutions can expect to recruit students from returning service men and women if their programs are flexible enough to attract them and deal with their interests. A number of service personnel were introduced for the first time to libraries and to reading as a method of helping to solve their problems or to broaden their background. Civilian librarians, therefore, have a new group of potential borrowers.

1. *Leadership in Adult Education*

Many veterans have had experience in the leadership in adult education. The successful conduct of the off-duty programs required a large number of persons to serve as leaders. Since such persons do not occur in large numbers in civilian life, it was necessary for the Army and Navy to impress into this kind of service a wide variety of people—schoolteachers and administrative officers, college teachers, librarians, and many whose connection with formal education had been more tenuous. Such persons had to learn about adult education the hard way, but many of them did learn. They returned to civilian life with some competence in adult education, but—even more important—with an interest in the field.

Men in hospitals found that an educational program was a part of their environment, carried on by the agency which, for the moment, was the major organization with which they were concerned. In civilian life, this same principle obtains. Men and women are more likely to be interested in and to participate in activities which are part of the program of their churches, their service clubs, their unions, or their places of business.

2. Demand for More Education

The more education that mature people have, the more likely they are to want more. Again and again, both the Army and the Navy found that there was a positive correlation between formal education and participation in their programs. In one study which questioned a large group of soldiers, 73 percent of the college men said that they were interested in taking educational courses during demobilization, while only 32 percent of the men with less than grade school education had the same intention. As more and more of our population is made up of people who have had formal schooling, a greater and greater demand will be made for adult education. And as those who have not had formal schooling are introduced into adult educational activities, the motivation to continue will be increased.

3. Relation of Learning to Everyday Life

At every stage of the instructional process the student should see clearly how his learning is related to the ongoing aspect of his mature life. In discussion programs, interest was generally higher and participation greater when the topic discussed had relevance to current world events, immediate problems, or geographical surroundings. In so different a situation as the Army literacy program, the same rule applied. The method was described by Seidenfeld and Witty in the *Adult Education Bulletin* for October 1943 as follows:

All teaching materials are presented in the form in which they appear or will be used in the soldier's daily life. The functional approach is designed to relate closely to life experiences and needs; by its very nature, it promotes and sustains interest. Through this approach the program offers the student immediate use and application for his skills. At the time he acquires the simplest skill, such as writing his name or his Army serial

number, he finds an opportunity to use this skill promptly in satisfying an immediate need. Thus, he comes to realize that education pays profits. Reinforced by this knowledge, he often turns to his studies with renewed interest and effort.

4. *Adult Motivation*

Learning will be improved if the student is constantly made to feel responsible for his own education. This motivation is usually more frequently found in adult education than in the education of children. Mature people simply do not undertake learning experiences unless they have a feeling of need for them. The Army and Navy found, however, that this initial motivation must be maintained or the learning program failed.

5. *Discussion Method*

The use of the discussion method in educational activities has implications for the more effective performance of the basic work of an agency. It was found in both Army and Navy that the educational program gave an opportunity for natural leaders to manifest themselves, for men to relieve personal tensions, and for problems which need special handling to come to light. This principle has application particularly in educational programs carried on within broad agencies such as industrial and commercial concerns, labor unions, and cooperatives. It also has a more general implication, however, for all kinds of agencies. A discussion group sponsored by a library, a church, a public school, or any other agency may have important consequences for the improvement of community life.

6. *Methods of Presentation*

The use of many kinds of materials is more effective than the use of one kind. It has already been discovered that foreign language sound recordings require the use of manuals. Similarly, it was shown on many occasions in the Army and Navy that visual devices were more effective when they were coupled with other methods of presentation. In one study, three groups were given a short test. Group A saw no films nor heard any talk. Its average test score was 20. Group B saw the film only. Its average score was 29. Group C saw the film and

heard a short explanatory talk. Its average score was 35. In another study, *Newsmap* was found to be more helpful when used with talks on the news.

7. *Correspondence Courses*

Correspondence instruction is an extremely useful device for education of adults in a wide variety of situations. The Army and Navy programs gave a great impetus to this kind of instruction and indicated its potentialities to many people. It is apparent that civilian adult educational instruction, particularly university extension divisions, have a great field of service open to them if they wish to develop a broader service in this area.

8. *Influence on Attitudes*

The attitudes of adults may be changed by presenting factual information. The orientation programs supported this contention fairly clearly. Furthermore, it was supported in a study of enlisted men in twelve infantry and armored divisions, who were given a brief quiz on current affairs and then divided into four groups of equal size based on scores made. An attitude analysis revealed that the top fourth of the men had the best attitude. To demonstrate this principle further, men were later given varying amounts of information. The results demonstrated that those who gained the most information also displayed the most improvement in attitudes. Many civilian adult educators, with the impression that the attitudes of mature people are so fixed that nothing can be done about them, have restricted their objectives to skills and knowledge. They may be encouraged by these findings to attempt to achieve more significant goals.

9. *Increase in Tolerance*

Adult educational activities may provide for marked increases in racial, religious, and social tolerance. Two different kinds of evidence support this conclusion. Some of the programs, notably the Army information and education activities, attempted to teach tolerance directly, with some evidence of success. And, even more broadly, representatives of all different racial and religious groups participated together without serious difficulty

in educational programs. They therefore had direct experience in working together toward common objectives. In civilian life, adult educational activities may prove to be one of the best means of bringing together easily and naturally people of diverse cultures and backgrounds, and, thus, through common activity, reduce the tensions which they otherwise feel.

XII. TRAINING OF CIVILIANS IN WAR AGENCIES

WITH FEW exceptions the war training programs for civilians within and outside of the armed services may be described as accelerated, abbreviated, apprenticeship training, on the emergency job, for the emergency job. The teaching and the learning were stripped to those elements essential for immediate performance. Time was a precious resource to be conserved. The needed most had to be attempted, oftentimes without the needed least, in the form either of attitude or of natural ability, on the part of teacher or learner.

Consideration of these programs has kept in mind constantly certain controlling factors. First and foremost were the emotional circumstances produced by the war. The life of the nation was at stake. For the overwhelming number of the learner and teacher workers this induced strong impulses for rendering the best of service. As to the large proportion of women involved in this training, the war situation opened a new way of life that presented opportunities for service and sacrifice. Next, the learners in these new schools of war were on a payroll, a factor not to be disregarded. Then, too, it was easily seen that the learning was harnessed directly to the doing. Learning was a requisite for employment for effective production. The potential value of the acquired skills for the later working life was easily to be seen by many.

Only to a limited extent do these war factors play any part in the organized educational processes of peacetime.

WAR DEPARTMENT TRAINING OF CIVILIANS

The official record shows that on January 1, 1940, there were fewer than 100,000 civilians in the War Department. In the last month of that year there were more than 40,000 being trained for War Department work. Sixty percent were pointed toward mechanical skilled jobs in aircraft work; 20 percent were being prepared for mechanical skilled jobs in the technical services; and 20 percent were training for engineering, scientific,

technical, administrative, and supervisory work. This latter training was conducted largely by agencies set up during the national defense period, such as Engineering, Science and Management War Training, and Vocational Education War Training under the Office of Education.

Development of Training

Up to the beginning of 1941 when the shortage of skilled workers became acute, the controlling idea had been that the War Department had no immediate responsibility for the training of civilians. Officials believed that it was the responsibility of the Civil Service Commission to furnish the fully qualified civilians needed. No organization existed at the top of the Department for dealing with the civilian training problem.

On July 10, 1941, the Secretary of War issued an important statement of policy on civilian training. Thousands of training programs were quickly developed. These programs led to the creation of an efficient and loyal body of civilian personnel totaling at its peak approximately 1,500,000 employees.

The tasks assigned to the first director of civilian training for the War Department were: (1) to activate the civilian training policy for the Secretary of War through personal leadership; (2) to assist and advise the forces, services, and commands in the development of adequate training programs and the organization of competent training staffs; (3) to coordinate the training of the civilian employees who were coming into the installations of the War Department at the rate of approximately 5,000 a week, which number increased to over 15,000 a week in 1942 and 1943; and (4) to direct the centralized orientation and training of clerical, technical, and professional supervisory and administrative employees.

The first statement of policy was amended in October 1941 so as to provide for the establishment of competent training staffs at each echelon of authority, including field establishments. Under the state-wide training policies, programs and facilities were set up to do the largest civilian training job for employees ever attempted by the federal government.

Later, on June 30, 1944, the two statements were combined and

reissued by the Secretary of War. This reaffirmed the policy of responsibility for training and amplified the organizational relationships for civilian training. In May 1943, Congress for the first time granted authority to expend general War Department appropriations for civilian training, including the payment of tuition.

Application of Policy

Although exact figures are not available, it is known that the War Department trained approximately 3,000,000 civilians for service in the Department. Except a very small percentage, all of this number had to be trained for the work they were to do. In most instances, they were totally inexperienced and had to be taught the total job.

The monthly training load carried by the Army in May 1944 varied from 100,000 to 115,000 in training. Approximately 75,000 new employees received initial training for a job every month. In addition, between 25,000 and 40,000 employees received upgrade training to improve their work skills or to develop or improve them as supervisors. The training given was divided into 20 percent supervisory and administrative work, 5 percent technical and scientific work, 25 percent clerical work, 10 percent inspection work, and 40 percent in mechanical work.

Pre-Induction Training

Early in 1942 the War Department issued statements describing the general types of instruction that might be made available to the young men destined for induction into the Army. These included map reading, first aid, hygiene and sanitation, physical conditioning, the nature and objectives of the war. The proposed instruction was to be entirely voluntary and would contain no training of a purely military character. As the draft age was lowered, the pre-induction training came to have immediate importance for a large number of younger individuals yet in high school.

A pre-induction section was established within the War Department. Through this section, cooperative relations with civilian agencies were to be maintained on federal, state, and local levels.

Within this section there were several units: one for the determination of manpower needs, as to skills and numbers; one to survey civilian training activities available; one for courses of study; and one for liaison with state and local agencies.

Efforts to secure federal funds for the pre-induction training or for the High School Victory Corps, or for dealing with the problem of illiterates liable for military service failed. This, along with the decentralization of the operation pre-induction plan, the organization of the Army Specialized Training Reserve program, the lack of provision for reaching out-of-school youth, the shortage of trained teachers, and the transfer to the Office of Civilian Defense of the "Orientation to the Army" program served to prevent the effective development and coordination of the programs. At the same time, the High School Victory Corps, during 1943-44, enlisted the active interest of 70 percent of all the high schools of the country.

These pioneering ventures, while not markedly successful, afforded striking evidence of the need of including within any plans for national security, during an emergency, adequate provisions for the unified utilization of the nation's educational system, particularly the secondary schools. Through these schools practically all of the youth of the nation can be prepared for R-Day, that is, Ready-Day.

NAVY DEPARTMENT TRAINING OF CIVILIANS

From the standpoint of the special purpose of this study, there appears to be no essential difference between the Army and the Navy in the general policy of the training of civilians. The Navy, however, prior to the outbreak of the war, had in operation various training programs, especially in its ship construction installations.

The training branch of the Office of Industrial Relations has furnished the following data as to the number and variety of civilian employees trained in organized classes from July 1940 to July 1945. The total number of employees trained was 665,286, divided into:

1. Supervisory training, 82,349. Course of approximately four months, 90-minute sessions, twice weekly

2. Job instructor training, 24,897. Course of 36 hours, 90-minute sessions, twice weekly

3. Trade training, 491,965. Course of six to nine months. Classes organized in school one day a week; the other five days on productive work with job instructors giving required instruction and information for the development of skills and techniques

4. Clerical training, 58,003. Course of six to twelve months, based upon the same procedures as for trade training

5. Apprentice training, 8,072. Training in metal and wood-working trades. Reduced from four to three years during war emergency.

TRAINING FOR THE MERCHANT MARINE

A study of the evaluation of war training activities would be incomplete without a survey and examination of the vigorous program conducted by the training organization of the War Shipping Administration. This program of training reached about 180,000 American men in the various tasks of operating ships and consisted of three phases: (1) U. S. Maritime Service, (2) U. S. Merchant Marine Cadet Corps, and (3) State Maritime Academies.

The U. S. Maritime Service

This was the largest unit of the three training groups. Its activities were handled by four branches, each covering some particular phase or scope of training for licensed or unlicensed ship personnel. The training stations offered preliminary training required by inexperienced personnel, followed by branch training in the deck, engine, or steward's departments. The officers' schools trained seamen who passed the minimum required time at sea to become licensed officers in the deck or engine departments. The radio training stations gave training to qualified men who wished to be radio operators. The upgrade schools provided training in the deck, engine, or steward's departments for men who possessed the qualifications and required sea time to raise their ratings or licenses. In addition, the U. S. Maritime

Service operated special training courses in such subjects as ship carpentry, assistant purser, hospital duty, and signalling.

Through the Maritime Service Institute, this agency also provided correspondence courses to merchant seamen and officers who wished to upgrade themselves by study while at sea. During the war, approximately 250 men a month registered for one of a large number of technical courses. Personal professional guidance was given to those wishing to take a course. The instructors formulating and grading the material were of high competence, and the Institute took care to keep material current and adapt it to the needs and preferences of the seamen as demonstrated by experience.

It was necessary to provide refresher courses at night for those studying a radio course, which had been cut from forty to twenty weeks. The result was that unless a student had a good background in mathematics, he had to study the subject almost every evening in order to pass the course. Most of those who did not regularly attend the night courses were dismissed or failed. A rigorous system of retaining only the superior and hard-working students produced the best operators.

The U. S. Merchant Marine Cadet Corps

This corps trained cadets to be deck or engineer officers. The course (similar to that of the state maritime academies) included twelve weeks basic training, six to nine months aboard merchant or training vessels, and at least thirty-six weeks advanced study for the license examination.

The State Maritime Academies

The five academies are located in Maine, Massachusetts, New York, Pennsylvania, and California. They also train officer candidates for deck and engineering positions. During the war the academies doubled the annual number of their graduates (750) and decreased their two- to three-year programs by several months. Cultural subjects were omitted, and those academies that granted B.S. degrees could no longer do so.

Faced with the necessity for training men how to operate ships efficiently, in the shortest possible amount of time, the

training organization eliminated cultural courses and even more time in some cases. In all courses, training aids and devices were widely used. These aids included films, filmstrips, models, graphs, charts, correspondence and refresher courses.

The training-aids unit supplied numerous realistic charts in color, which were used extensively to illustrate verbal descriptions in textbooks. To develop variations in technique of chart-making and to keep abreast of developments in commercial printing outside the service, the training-aids unit maintained an experimental laboratory where one or two men were constantly testing new methods and materials.

WAR MANPOWER COMMISSION

By executive order, the War Manpower Commission was established on April 18, 1942. The chairman was specifically directed to establish policies and to prescribe regulations governing all federal programs relating to the recruitment, vocational training, and placement of workers to meet the needs of industry and agriculture. Amendments to the original executive order of establishment brought the National Roster of Scientific and Specialized Personnel, the Office of Procurement and Assignment of the Public Health and Welfare Service, and the National Youth Administration under the jurisdiction of the Commission.

Within the organization of the Commission was the Bureau of Training charged with the development of programs and policies to meet training needs of wartime employment, and to obtain the most effective utilization of training resources by coordinating the programs of the Apprenticeship Training Service, Training within Industry Service, and the War Training Programs of the U. S. Office of Education.

TRAINING ACTIVITIES OF THE OFFICE OF CIVILIAN DEFENSE

As a result of the National Civilian Defense Program, approximately 5,500,000 persons received an average of twenty-seven hours of training in some phase of civilian defense. The entire program was voluntary and any individual over sixteen years of age was eligible to participate.

The Office of Civilian Defense was the central agency in Washington which coordinated, advised, set standards of achievement, and supplied information, essential equipment, and training materials to the numerous local and state defense organizations. The OCD had no direct control over these organizations, although it imposed certain requirements in connection with the loan of federally owned protective equipment and the use of officially prescribed insignia. The local defense councils (which formed defense policy on the local level) were free to adapt central planning to their own communities, to select their own instructors, prepare detailed instructional plans, and to certify instructors and students. Nine regional offices of the OCD integrated the activities of other federal agencies with the programs of the state and local defense councils. The regional offices worked closely with state and local defense councils by contributing leadership, advice, and assistance.

There were three different stages of training—basic, special, and in-service. Basic training was to acquaint the individual with the nature of a threatened attack, of civilian defense organization, of the air-raid warning system, of the control center, and of activities in a black-out and dim-out.

Such basic orientation to the program was followed by special training which equipped workers for specific duties. These courses were for a variety of functions or positions such as air-raid wardens, bomb reconnaissance, gas protection, auxiliary firemen, forest fire fighters, rescue workers, auxiliary police, recruiting personnel, plant protection, control centers, first aid, messengers, and ambulance drivers.

For each of these training courses the OCD issued a complete job description which carefully defined the responsibilities a person would have in his particular job. This description was in three parts, defining the job responsibilities before, during, and after an emergency. The descriptions were used as a frame of reference for training courses, since the basic purpose was not merely to give information but to prepare workers for effective action under certain circumstances. As a result, emphasis in instruction was on practice, and factual knowledge was presented only to the extent and in the way in which it could contribute

to concrete situations in which the workers served. When included, factual knowledge was presented by lecture, discussions, study of charts and motion pictures.

Special training was followed by in-service training which was accomplished by demonstrations, field exercises, and appraisal tests originating from the OCD. This further training also informed workers of latest scientific developments in warfare against civilians and how to combat them. Another purpose of the appraisal guides was to stimulate interest and retain skill, and to find gaps of knowledge in order to remove them.

An interesting observation has been made to the effect that the organization of the civilian defense programs was formed to correspond to traits of behavior inherent in Americans. The people didn't want to be arbitrarily assigned to do certain things at a certain place at a certain time. They did want pertinent information as to the nature of enemy attacks, the scientific means of combating the attacks, and training information for the various functions that would have to be performed. The OCD supplied these and the communities supplied the local initiative in recruiting and training the personnel to carry out the detailed plans adopted in and for the locality.

THE TRAINING ACTIVITIES OF THE AMERICAN RED CROSS

The American Red Cross again, during the war, proved its right to a pre-eminent rank among the agencies creating the American mind. This mind expressed itself through country-wide voluntary cooperation for the promotion of utilitarian idealism. Here was civilian war training at its best.

The war led the Red Cross to expand and to intensify its adult and junior training programs. Its records show that during 1944-45 nearly 1,500,000 persons were given training.

It is scarcely pertinent to the purposes of this study to describe in detail the content or method of the courses of instruction. The outlines for student and instructor were the products of the long, varied, and tested experience of the organization.

The war gave fresh impetus to the Red Cross, and all of its activities designed for the conservation of life and welfare. The lesson for American education is clear. If democracy is to mean

the voluntary cooperation of all for the benefit of all, the ideal and the practices of the Red Cross will become, to an increasing extent, part and parcel of all organized American education.

GENERAL CHARACTER OF TRAINING

To meet the inescapable needs in and for the armed services dictated by the conditions of mechanized warfare, millions of civilians had to be trained anew. Abilities and skills of other millions had to be converted for the new tasks of war. Hundreds of courses of instruction were set up and applied. Examination of several hundred plans, outlines, and directives dealing with scope, methods, facilities, and application of instruction yields the following conclusions:

1. The training periods were short and intensive, through the operation of in-service training, whole-time or part-time school instruction.

2. The particular job for which training was intended was completely analyzed and described by printed word, drawing, chart, model, motion picture, and so on.

3. The order, content, and purpose of the teaching were under continued review and revision.

4. Within the restriction of time, place, and available personnel, reasonable efforts were made to screen and to select both teachers and trainees fit for training.

5. The critical importance of competent supervision and inspection was recognized throughout.

6. The vocational training programs for war production workers involved the training of more than 8,000,000 individuals for service to the armed services, industry, and government departments. These programs conducted throughout the country by the state boards for vocational education, with federal funds and under the leadership of the U. S. Office of Education, represented a major section of the civilian training to meet the needs of the war.

7. The procedures designed and developed by the agency known as Training within Industry exerted a widespread influence in most of the areas of civilian training.

8. Data for the dependable measure of the success of the

training programs do not exist. This is as might be expected. Under the high pressures of necessity of getting jobs done, there was no opportunity to diagnose efficiency in the terms of training, or to calculate the cost. Especially during the early stages of the war the problems of training were aggravated by constant rapid turnover of civilian workers.

The evidence in the case is indicative that (1) the training conducted was upon an emergency design for emergency duty; (2) for the most part, the training involved adults and was designed for quick fitting of workers for single skills on an assembly line of mass operation and production; (3) the conditions of this training were abnormal and radically different from those obtaining during times other than war; (4) both teachers and learners were under social, economic, and personal urges centered in war and not in peace; (5) much of the training had but little relation to the peacetime learning, living, and working of our people; and (6) throughout, there is to be observed a marked and continuous tendency of the civilian training for war purposes, by and outside of the armed services, to concentrate its efforts upon the selection and ordering of the minimum essentials of the things to be taught and learned. The possible constructive significance of this is indicated in the section below relating to instructional procedures.

LESSONS FOR CIVILIAN EDUCATION

There is a number of potential outcomes that might serve to balance the scales of experience with civilian war training. These have to do with the techniques and primary objectives of teaching; and with federal educational activities and relations.

1. *Instructional Procedure*

The civilian training programs represented knowledge stripped for action. Training, whether for the wholly untrained, for the upgrading of workers, or for qualifying supervisors and inspectors, was confined to, and concentrated upon the minimum essentials for clearly identified performance. Time and circumstance made it very necessary that the paths of teaching and learning not be cluttered with accumulated incidentals. The magnitude

of the complicated mechanism of war made possible fine divisions of labor. Each job became a narrowly specialized job. This, when broken down into its components, permitted effective order of teaching and of learning. Repeated experience revealed the points of difficult learning.

It appears that this characteristic of the civilian war training programs provides a lesson for the improvement of much of the teaching in all grades of American schools. To be sure, there are those who would dismiss these programs merely as makeshift efforts to train human beings, under wholly unnatural conditions, for robotlike duty. They would argue that there was no significance for an education or training aimed to the development of individual personality. Yet there are many, aware of the ineffectiveness of much of what passes for teaching today, who will be inclined to interpret the training programs in terms signifying the need of better planning of teaching and learning so that both teacher and learner may be more constantly aware of the fundamental importance of that minimum of literacy which includes the ability to understand and to manipulate the elementary symbols of communication in this technological age, especially reading, writing, calculation, drawing, and oral expression. They are the foundation for occupational literacy.

2. Training for Production

The responsibility of industry for maintaining training as a "tool for production" is no longer a matter for argument. That is, if industry is to capitalize the full worth of workers, and if workers are to be given their rightful opportunities. Industry as a whole may no longer depend upon schools or mere chance to create pools of skill from which it may meet its needs.

3. Training for Government Service

No part of this study has left a deeper impression than that having to do with the training for service in the several departments of the government. War conditions made necessary the establishment of special training units within most of the principal departments. If government is to secure and retain, as it should, its full share of the working competence of the country,

it may not neglect the continuation and further development of the in-service training of employees designed for their continued improvement and upgrading.

4. *Federal Educational Activities and Relations*

The war led to new expansions of federal activities for training and education. These have now reached a point of indicating the necessity of a comprehensive re-examination of the present federal undertakings having to do with education and training for the purpose of effecting their coordination, *at the federal level*, and their economical adjustment *at the state level*.

XIII. TRAINING OF WOMEN IN THE ARMED SERVICES

THE WARTIME women's military services were the Women's Army Corps (WAC), the Women's Reserve of the Naval Reserve (WAVES), the Women's Reserve of the Coast Guard (SPAR), the Marine Corps Women's Reserve, the Army Nurse Corps, and the Navy Nurse Corps.

The Women Airforces Service Pilots (WASP) and the Cadet Nurse Corps of the United States Public Health Service were civilian organizations and were not militarized. However, the WASP was like the women's military services in all other respects, and the work of the Cadet Nurse Corps was closely coordinated with that of both the Army and the Navy Nurse Corps.

The duration and status of these eight services varied. The WAC, established in May 1942 as the Women's Auxiliary Army Corps (WAAC), became a regular component of the Army in September 1943. The Women's Reserves of the Naval, Marine Corps, and Coast Guard Reserves, established early in the war, had from their beginning the status of regular components of their respective services. The SPAR was terminated June 30, 1946. It seems probable that the WAC, WAVES, and Marine Corps Women's Reserve will be continued as permanent agencies.

WASP, established early in the war and inactivated in December 1944, was composed of civilians with civil service status. Cadet Nurse Corps was made up of civilian students who had committed themselves to practice nursing for the duration of the war and who, in many cases, elected to perform that service in the Army or Navy Nurse Corps. The Cadet Nurse Corps was established in 1943, and students were last admitted to training in October 1945. The Corps will operate until all its members have completed training in 1948. The Army and Navy Nurse Corps were in existence for many years before World War II and will continue as organizations.

All members of the women's services were volunteers. The requirements for admission to these services were higher than selective service requirements for men. In the great majority

of cases, the women had completed high school, and there were many women with college experience. No woman with young dependent children was accepted. For Army or Navy nurses, graduation from nurse training and registration in the profession were required.

The military training of women did not include the use of weapons, and none were trained for combat duty, although a number of contingents of the WAC and large numbers of Army nurses were trained for overseas duty and served in the various overseas theaters of war. Members of the naval services were trained only for duty in shore establishments, with the exception of some Navy nurses who served on hospital ships.

THE NUMBERS INVOLVED

Condensed summary data relative to the magnitude of the several women's military services are exhibited in Tables 2 and 3.

It should be added that in addition to the 153,716 women in the Army and the 121,465 women in the Navy on June 30, 1945, 16,454 cadet nurses had been graduated by that date. Moreover, 916 women pilots were on duty with WASP at the time of their inactivation in December 1944.

NEW FIELDS FOR WOMEN

The WAC, WAVES, SPAR, and Women Marines sought relatively large numbers of recruits possessing certain skills

TABLE 2
WOMEN ON ACTIVE DUTY IN THE U. S. ARMY AS OF JUNE 30 EACH YEAR, 1940-45

Women in Army	1940	1941	1942	1943	1944	1945
Officers (WAAC and WAC) ..	.....	.....	.. . . .	4,917	5,845	5,733
Enlisted women ^a . . . . .	.....	.....	.....	55,326	61,370	90,780
Nurses	939	5,433	12,475	30,316	40,018	53,291
Dietitians ^b . . . . .	.....	.....	.....	666	1,210	1,623
Physical therapists ^b . . . . .	.....	.....	.....	323	643	1,173
Doctors . . . . .	.....	.....	.....	°	°	72
Warrant Officers . . . . .	.....	.....	.. . . .	.. . . .	10	44
Total	939	5,433	12,475	91,548	109,096	153,716

^a Includes officer candidates.

^b Data not available until they had commissioned status, 1943.

^c Data not available.

TABLE 3

WOMEN ON ACTIVE DUTY IN THE U. S. NAVY AS OF JUNE 30 EACH YEAR, 1940-45*

Women in Navy	1940	1941	1942	1943	1944	1945
Navy:						
Officers				3,827	7,611	8,385
Enlisted women ^a				21,717	57,981	73,813
Nurses	442	671	1,778	5,431	8,399	11,086
Marine Corps:						
Officers				244	797	831
Enlisted women ^a				3,399	16,680	17,606
Coast Guard:						
Officers				235	704	867
Enlisted women ^a				2,956	7,456	8,877
Total.	442	671	1,778	37,809	99,628	121,465

* Data from Table A-15, *Annual Report Fiscal Year 1945: The Secretary of the Navy to the President of the United States*.

^a Includes officer candidates

which the military services needed immediately. Indoctrination and semiskilled and semiprofessional courses were planned to make the skills of the women recruits available in military form within the shortest possible time. In most instances, these skills were in fields in which women had received civilian training and in which many women were already employed; in short, they were "women's jobs."

The method of training and the utilization of these service women, however, closely resembled those of servicemen, and the significance of this fact for civilian education lies in that women were permitted, practically for the first time, to practice these skills in an occupation from which they had been excluded, and that they were employed on a basis of equality with men soldiers in the same types of positions.

The women who were trained for employment in military aviation entered a field that was new for men as well as women. Military aviation was the most recent, the most dramatic, and the best publicized of the different branches of the services, and this fact is of importance to women. Because, for example, the Army Air Forces had so much less of tradition than other Army branches, the utilization of women presented a less marked change in their pattern of organization for warfare.

So many experiments in the testing, classification, training, and

assignment of personnel were conducted in the AAF that the addition of a group of women was not particularly striking. The air force was of the greatest interest to the civilian public, and the fact that women were permitted to be pilots and mechanics and control-tower operators was widely known.

In 1941 and 1942 the first plans were made to recruit and train and use women in the aviation services, and these plans had to begin with the very foundations. Contrast this situation with, for example, the plans for expanding the personnel and services of the Army Nurse Corps and the Navy Nurse Corps. There were in existence more than a thousand nurse training schools; women had served as nurses in large numbers during the first World War; there were many thousands of experienced nurses and teachers and supervisors; male medical personnel in the Army and Navy were accustomed to working with women, and men patients accepted women nurses as a matter of course. Nothing could present a more striking contrast with the position of women in military aviation, and when this is fully realized, their record of achievement is proportionately more important.

The few thousand women who were trained and were on military duty as pilots, mechanics, instructors on training devices, control-tower and radio operators, flight orderlies, and flight nurses were as truly pioneers in the history of women in aviation as were the first women who, only a few years earlier, had dared to learn to fly a plane.

It is perhaps surprising to realize how few women there were who were connected with military aviation. If all the Wasps, all the Wacs, Waves, Spars, and Marines who were on duty in aviation, and all the Army and Navy nurses who were on flight duty are included, the total is not large. Because of differences in the methods of compiling records, exact data cannot be presented nor can subtotals based on different types of training or assignment be compiled. Many of the women assigned to aviation actually performed clerical, medical, and other types of duties not precisely classifiable as "aviation."

There was so much publicity—desirable and otherwise—about "women in aviation" during the war that the public has more certainty about their record than is warranted. While this situa-

tion must be recognized, it is nevertheless true that such information as we have is valuable to a degree far beyond its extent. Before the war, few women indeed were engaged in any activity connected with aviation, and the addition to their numbers of a few tens of thousands during the war years furnishes us with more information than would have been produced in a much longer period of peace. Furthermore, the variety of their experience during the war was greater than would have been the case during an equal period in peacetime.

All that has just been said of women in military aviation was true to some extent of women in the other military and naval services, and is cited here merely as an example. In all the services there were many instances of women assigned to routine jobs at first who subsequently proved their abilities in more advanced and specialized assignments, many of which had not previously been thought suitable or possible for women.

LESSONS FOR CIVILIAN EDUCATION

The war proved that in time of grave national emergency, when the common security is threatened, no small proportion of the might and skill of the nation is readily available from women. This fact is of significance for our economy and for our education of the future.

1. *Overcoming Prejudice*

The war experience with women in the armed services tended strongly to undermine certain prejudices and misconceptions regarding their capacities and characteristics, such as their adaptability to group living as members of a military organization, their amenability to discipline, their maintenance of morale, and their capacity to learn and perform duties of such nature or under such conditions as had generally been thought inadvisable or impossible for women.

2. *Women as Leaders*

Perhaps most significant of all was the extent to which women in the armed services received opportunities for and demonstrated their fitness for positions of administration and leadership.

3. *Equal Opportunity for Women*

It appears that women can be taught to do what men can be taught to do, with allowances for physical differences in cases where they are relevant. The experiences of women during the war, not only in the women's military services but in all sorts of occupations, have lessened the cultural differences between men and women. This development is of importance in relation to one of the prime objectives of civilian education in a democratic society—the offering to all young men and women of equal opportunities to develop their capacities. As a practical matter, the speed with which civilian education is shaped in accord with that principle, and the extent to which it moves in that direction, will also be influenced and accelerated or retarded, as the case may be, by the rate of evolution of contemporary and future cultural and economic conditions.

With these observations concerning the education of women in general, it is appropriate to examine in some detail the lessons to be derived from the wartime organization and conduct of instruction in a more specific area.

IMPLICATIONS FOR NURSING EDUCATION

Every military, government, professional, educational, and volunteer organization in the field of nursing was utilized to the full in the wartime emergency, and the result was a complex large-scale cooperative venture which had remarkably successful results.

1. *Cooperation of Agencies*

The Army through its Medical Department and the Women's Army Corps and the Navy through its Bureau of Medicine and Surgery and the Women's Reserves of the Navy and the Coast Guard were the two agencies responsible for procurement, assignment, training, and utilization of several different types of female personnel needed to care for the sick and wounded of the armed services. In achieving this goal numerous government and civilian agencies were asked to aid, and the result was a complex large-scale cooperative venture which produced remarkably successful results.

The Federal Security Agency, through the United States Public Health Service, was responsible for an important part of the program—the Cadet Nurse Corps. This nonmilitary government agency utilized professional nursing organizations, state boards of nurse examiners, civilian and Army and Navy hospitals, and schools of nursing to increase the available supply of nurses. The Red Cross and other volunteer agencies furnished semiprofessional personnel. Such a coalescing of varied forces is often the key to success in a desired program of education in peacetime.

2. Dovetailing Practice, Study, and Teaching

In the armed services, the inseparability of training and duty, of didactic and applicatory teaching, of theory and practice suggests a possible closer coordination of these elements in time of peace. The practitioner should also be student and teacher, and should not separate those functions too sharply and exclusively at any point. Learning the profession completely does not precede the beginning of its practice, nor does practice mean that the practitioner ceases the study of her profession.

3. Speeding the Tempo of Training

Civilian schools of nursing participating in the federally aided wartime program shortened and accelerated their period of instruction, retaining a large part of the essential didactic and theoretical training, so that a subsequent period of formal internship in a hospital could conclude the training and meet the requirements of state regulations concerning professional certification. The twofold result was to increase the teaching capacity of the schools and to get semitrained nurses into service at an earlier date, at a time when they were desperately needed.

4. Increased Specialization

Armed services training tended to emphasize and increase the tendency toward specialization within the profession of nursing and its related semiprofessional and subprofessional pursuits. Though open to much debate, the tendency will probably gradually increase in time of peace, and rightly so, as the complexity and variety of the services rendered increase.

5. *Greater Demand for Good Service*

The status of the profession of nursing appears to have been appreciably improved as a result of the war. There were more positions and several new kinds of positions in the Army and Navy Medical Departments, and the standards and pay were high. Hospital service and dietetic service provided for the armed services were abundant and of superb quality, and this will tend to create an increased and effective postwar demand for equally abundant and good services for civilians.

6. *More Flexible Admission Policies*

Civilian education can learn from the various wartime training courses for nurses, dietitians, physical and occupational therapists, and allied specialists that it is both possible and advisable to offer alternative prerequisites for admission in order to be certain that no competent trainees are barred by inability to meet rigid technical requirements. Such an admissions policy should be accompanied by arrangements for varying the content of courses to correspond with the variations in the backgrounds of students.

7. *Training of Functional Units*

The Army and Navy medical departments gave much emphasis to "team training" of selected groups of medical and nursing personnel. They did not send a dozen individually trained specialists into the field as a medical unit, hoping that a leader would develop and whip the team into shape, or that by some unknown miracle these specialists would develop an effective cooperative technique. "Team training" can be profitably developed to a greater extent in civilian education in many fields, as well as in education for the medical and allied professions.

8. *Health Care of Trainees*

It was found that specific provision must be made for a health program for the young women in training, embracing pre-entrance examinations, immunization, preventive medical and dental service and general hygiene, hospital care, subsequent medical and dental examinations, environmental sanitation, and

recreation and physical education. From this experience there is sound implication for other educational and business institutions with responsibilities for students and trainees.

CONCLUSION

The fact that women were admitted to the armed services because their participation in the prosecution of the war was needed, that their very limited usefulness at the beginning of the war was superseded within a short time by increased participation (on the basis of number of women employed and number of occupations open to them), and that, as the war went on, the training and utilization of women became increasingly like the training and utilization of men—in short, that the occupation of waging war was opened to women on conditions which tended toward equality—this fact has implications of great importance for the education of women in the civilian world.

XIV. VOCATIONAL TRAINING AND EDUCATION

THE TECHNICAL nature of World War II became better known with the release of the atomic explosive. But between two wars, Germany far outdistanced us in the development of long-range rockets, pilotless aircraft, heavy tanks, the triple-threat 88mm rifle which could fire (1) armor-piercing shells at tanks, (2) air-bursting fragmentation shells at infantry, and (3) antiaircraft shells. Germany also developed smokeless, flashless powder which helped to conceal its fire positions. Japanese campaigns in China, the Italian campaign in Ethiopia, and the Spanish Civil War gave our enemy ample opportunity to test new weapons.

After North Africa our lack of research in peacetime with respect to military instruments was glaringly apparent. Gen. George C. Marshall in April of 1943 set up a program for developing and modifying weapons and improving techniques. The New Developments Division produced an unbelievable array of devices ranging from flame-throwing tanks to electronic devices for locating submarines.

The training of men and women, not only for the armed services but for the production lines, assumed a new significance along with the constant change in the requirements of war. In large measure, this was a war of specialization and job training. Throughout the study, evidence supporting this fact has been included, thus eliminating in large measure the value of treating vocational and technical education as separate special programs. Most of the lessons that relate to civilian education in general apply equally well to its integral parts.

However, certain lessons for vocational education as part of America's secondary and postsecondary school organization should be indicated in this special treatment of vocational education.

LESSONS FOR VOCATIONAL EDUCATION

It should be noted that, aside from technical and tactical proficiency, the qualities are all those which any civilian school should

aim to develop; and, with the exception of health, strength, and endurance, the qualities are all mental.

1. *Importance of Orientation*

The armed services recognized the importance of orientation as a factor in the learning of the skills required of the fighting forces. Films, lectures, and conferences were used constantly to explain why we fought and why it was necessary to learn. The advantage of learning and the part played by each one's contribution toward the total accomplishment of his group were also made apparent.

The great majority of youth are inclined to take things as they come during their school career and give little thought to planning or preparing for a definite goal or career. Schools are prone to offer courses as ends in themselves, rather than as means toward a final desired planned goal. Often courses, because of low standards of accuracy and orderliness, result in developing in the mind of youth the idea that these qualities are nonessential in life. Orientation courses would prove to be important factors in keeping youth in school if they explained why various subjects are taught, the relationship of one subject to another, and their value in later life. The Army training authorities appreciated this fact and hence the importance attached to orientation from the day the recruit reached the reception center.

In the same way orientation is desirable for employees who are beginning a new occupation. During the war a few industries saw the need and attempted orientation courses for new employees to inform them of their responsibility and place in the total work program of the plant. These courses varied from one day's duration to a week and consisted mainly of trips around the plant and talks by the foremen or superintendent.

2. *Functional Training Aids*

Functional training aids could serve more purposefully in civilian schools. One of the outstanding features of the armed services schools was the fact that many of the training aids were of a *functional* type. Many were built at great expense; some were planned to teach one fact only; others, especially in the field of

aircraft, gave most of the experience of actual aircraft operation and yet were stationary. Civilian schools have always had "recognition" type of training aids, such as photographs, motion pictures, charts, although far short of the extent to which these were used in the armed services, probably because of the greater cost involved in making the full-sized functioning type.

Vocational schools are, by their nature, better able to secure functioning aids than are the academic schools. Automotive classes can, and have, set up salvaged parts such as engines, transmissions, brake systems, etc., which the student can operate and practice on before he works on a real car. The Army carried this a step further, however, and put lucite windows in the crankcase and in the valve chambers of real cars and even built entire carburetors of lucite so that all the inner parts of the engine and its components could be observed as the car functioned along the highway.

In civilian schools full-sized functioning devices could be built, such as the one to teach the beginner to drive a pleasure car or a truck. This type of device would be stationary, with all controls and with road conditions simulated, even to an arrangement for practice driving in the dark with approaching headlight glare. To draw a lesson from a similar device used to teach airplane gunnery in the Army, the road conditions could be simulated by a moving picture on a screen in front of the driver. Incorporated in such a device would be the various drivers' tests. While it may be supposed generally that functioning training aids are mainly suitable in vocational classes, the greatest opportunity for the development of this type of aid is offered in general education, especially in such subjects as physics, chemistry, astronomy, geology, geometry, and commercial geography. For example, engineering colleges make some use of operating devices to teach natural laws in the physics laboratory and in such subjects as optics. These interesting and practical subjects have not been brought within the range of understanding of most high school students because of the lack of good functioning aids. Hence these subjects are not always within the range of the student's interests.

An Army basic field manual states that there is little in military

training that the average man cannot grasp if it is properly presented to him. The same is true of civilian education.

3. *Vocational Skills for Peacetime Production*

Training for some vocational skills required in war should be given in civilian schools during peacetime. It was fully two years after war was declared before the country was prepared to take a satisfactory offensive against the enemy. This delay was due in large part to necessary preparatory steps, in training tens of thousands of persons in the skilled occupations both in the Army and in civilian life. Production by industry for the Army was retarded because of lack of skilled help; while the armed services were organizing vocational classes to train the raw recruits in trade skills, civilian vocational schools were organizing and operating classes to train 6,000,000 new workers for industry.

Obviously the safety of this country cannot be jeopardized by waiting until the emergency is at hand before beginning training for vocational skills. This state of unpreparedness has been characteristic not only of the military situation but of industry as well. In general, the employers of the country's manpower have never planned ahead in the training of skilled help. When prosperity is at hand and skilled labor is scarce or nonexistent, vocational schools are expected to have skilled graduates available, and at such a time many industries start training programs of their own only to allow them to lapse when the immediate need of skilled labor has passed.

Probably 75 percent of the skills taught in the armed services vocational classes were of the same type and subject content as those practiced in civilian life. Examples are such subjects as refrigeration, electrical maintenance, radio repair, automotive maintenance, machine work, baking, shoe repair, and hundreds of others, as shown in the *Dictionary of Occupational Titles*. These subjects were all taught in the Army through short unit courses of from eight to twelve weeks' duration, each complete in itself. Such courses, established in the secondary schools of the country with a certain number made a part of the required curriculum of each student, choice being based on the student's own interest, aptitude, and future occupational plans, could produce a citizenry

with some skilled training for a start in a life occupation as well as with the equivalent of at least the first phases of the vocational training given in the Army.

Much of the training most nearly comparable to civilian vocational and technical education was carried on in the replacement training centers and the technical schools of the armed services. After this system of schools had got under way, it came to be regarded as an ideal plan. The fact that the armed services were now thoroughly mechanized and there were more different kinds of tasks to do that required technical and scientific knowledge made these schools more necessary in World War II than in World War I. These tasks could not be learned "on the job." A period of pre-employment training was necessary, considering the battle front or active fighting force as the "employment" for which the apprentice recruit was being trained. The battle front could not be hampered by the responsibility of training the radio operator, automotive mechanic, the cook, or the baker. If it had been, its production or battle-winning ability would have suffered.

This situation is analogous to that of civilians today in their relationship to employment. Life is highly organized and most occupations offering any satisfaction to the worker require particular training. The most highly specialized types of occupations are built on a basic skill which a person must possess if he expects employment in them. For example, an employee in the General Electric Research Laboratory is expected to have been trained previously in fundamental engineering, and beginning with this base the laboratory can teach him the specialized information necessary in its particular research.

In the same way the larger portion of those entering the skilled trades are expected by industry to have had previous training in the trade. Those without this training are subjecting themselves to the risk of being relegated to a dead-end job, a situation which often is not realized by the individual until too late.

4. Kinds of Training Needed

Closer liaison should be maintained between the field of employment opportunity and the schools. As has been indicated, each training course for a specialty in the armed services had a

clear objective. When the recruit completed a course he was expected to know how to do certain specific operations of a skilled trade. The justification for this course was the fact that a definite need existed at the front line. When that need no longer existed, the training for that need was expected to be discontinued. Training schools also were expected to anticipate the skilled needs of the front line and if new types of fighting equipment were in process of manufacture, training classes in their use were expected to be in operation so that trained men would be ready when equipment was delivered.

All this meant contacts between the front line and the training centers, and between the training centers and industrial plants where new equipment was being made. There were several ways in which information reached the people responsible for training. Chief of these were the official reports from the front to the military commands in Washington. Also there were trips by observers from training departments to the front line, personal letters from individuals at the front, and trips by training center officials to industry to secure information on new combat devices.

As it was important for military training centers to know the needs of the front line in the matter of skills required, so also is it essential that each unit or type of course in the civilian schools maintain constant contact with a changing world of employment opportunities in order to train for jobs which exist, and make sure that the skills acquired by the student are in accord with the needs of the times. Equipment and training processes may easily become outmoded in our vocational schools after a few years, and new processes may entirely escape the knowledge of vocational teachers and administrators unless definite and well-organized methods of liaison are practiced.

Responsibility for the inauguration of this liaison rests with the schools. Not only should studies be made from time to time of existing employment opportunities, but attention should be given to the trends in vocational education to anticipate new fields of employment as well as to become aware of those which are becoming obsolete and for which change-over in training will be required.

5. Definition of the Essential

In all types of instruction, nonessentials should be eliminated. Most of the courses offered in the armed services could boast of a clear objective, and there are many statements in the literature to the effect that nonessentials were eliminated. However, these courses were designed for military needs. For a specialist in a skilled occupation in the service the objective might be the same as for the same occupation in civilian life, but the nonessentials for the military specialist might be quite different from those of the civilian trainee.

For example, in case of the replacement of a broken gear in an automobile transmission, there was only one type and size of gear that would fit and only one best way to get the old gear out and the new one in. In order to accomplish the repair, then, it was merely a question of memorizing the steps to take. No theory was necessary, and scientific principles as to the hardness of steel were of no concern to the learner. There was no time for that. There was little time to teach the mechanic to think, and little time to develop his judgment. This all has a negative implication for the civilian school, since there the initiative, judgment, and reasoning ability of the growing youth must be developed to meet unforeseen future problems and only by the exercise of these abilities will he be able to solve these coming problems.

Only by teaching the fundamental facts on which to base judgment can the future vocational success of youth be assured. Non-essentials in a training course should be eliminated, but what may be considered nonessentials in the Army or Navy may be essentials in a civilian school. Course outlines should reflect a clear conception of the complete educational on-the-job requirements, not only in relation to manipulative skills and general understanding of why and how, but also in the matter of background, attitudes, and habits which enable the worker to live with his neighbors and take his part in community affairs.

6. Need for Trained Leadership

A definite program in the development of leadership is an important requirement in civilian education. The armed services

were much concerned about training leaders, and the training schools of every command operated courses in so-called leadership training. An Army *Basic Field Manual* states the significance of leadership as follows:

The leader gains the respect and confidence of those under his command (1) by his knowledge of his profession, (2) his example of courage, (3) self-reliance, (4) vigor, (5) by thought and care for the welfare of his command, (6) by his firm and impartial administration of justice, (7) by his loyalty to his subordinates.

This prescription is the requirement for leadership for the training of officers and noncommissioned officers. Other items could well have been added, such as ability to plan ahead, to analyze situations and form judgments, and to work consistently.

When the military services organized courses in leadership training, programs in judgment-forming were based on gathering the facts of a situation, analyzing them, and forming conclusions on the basis of the facts. All so-called leadership courses also included indoctrination in such areas as military discipline, care of clothing, inspections, and about fifteen other topics of a similar factual type. These were the things a soldier had to know to function as an officer. The candidate was also exposed to the responsibility of command of a group of men and observation by others of how he functioned, and if he did not possess the required capacity he was eliminated as potential officer material.

7. Need for Good Plan of Instruction

The armed services plan of training could serve as a model in the matter of sequence of steps. Observation of the armed services plans indicates that the training steps were as follows and in the order shown:

1. List all the occupations for which persons must be trained. This was done for the Army in the *Dictionary of Military Occupations (Classification Manual)*.

2. Show the scope of each occupation.

3. Make course outlines showing all items of subject matter to be taught for each scope.

4. Make detailed lesson plans to cover each course outline.

5. Select instructors.
6. Train instructors.
7. Select equipment for which need is indicated by (3) above.
8. Select trainees whose aptitude is suitable for (1) above.
9. Supervise instructional methods in classes.
10. Test the trainees to see if they have learned the subject matter shown under (3) above.

A similar plan may be applied to any civilian educational situation, especially vocational schools. There probably is nothing new in the idea, but the completeness and detail with which this plan was carried out in the armed services contrast decidedly with results often observable in civilian procedure.

In civilian education, especially vocational schools, item (1) above is usually accomplished in an entire community, or for an individual industry, by a more or less complete survey. The scope of each occupation or job (item 2) is seldom fully explored. Equipment is often selected simply because it is available and cheap, and what to teach is decided on the basis of the equipment available rather than on what must be taught. Finally, the test of the efficiency of the instructional procedure is seldom based on the degree of completeness with which the student has learned, which was the usual practice in the service classes.

8. Instruction to Fit the Student

It is the responsibility of educational organizations to bring the instruction within range of the understanding of the students. The armed services represented a cross-section of all educational levels of the citizenry of the country, and after the recruits were classified into the assignments where they could function best it became essential, if a successful army were to be constructed, that the courses operated should produce trained men. This meant that there must be very few failures. Emphasis came to be placed, therefore, on the thought that the learner must learn. If one method failed to teach, some other method must be found, and if any considerable number of students failed to learn from any instructor, the blame was on the instructor rather than on the student. There was a premium, therefore, on clear teaching methods. If a chart could be made clearer, or a better training

model be devised, then a duller mind could grasp the idea being taught or a bright intellect get it quicker, or larger classes could be taught by the same instructor—all of which made for more efficient training.

Making the difficulty of the learning fit the ability of the student to grasp is an important lesson to be obtained from armed services teaching philosophy.

9. *Transfer of Skills*

Schools can assist veterans to translate skills learned in the services into skills useful in civil life. A comparison of occupations listed in the *Army Classification Manual* and listings in similar volumes for civilian employment shows hundreds of identical occupations. Examination of the scope of these occupations—in other words, the things a person has to do if employed in any one of these occupations—shows that the automotive mechanic or radio repair man, for example, in the Army, has to follow the same processes and understand the same things as the similar specialist in civilian life.

The inference is that the specialist trained in the Army school can function in civilian industry. The limiting factor is, of course, that in the Army courses he learned to maintain only the type of equipment used in the Army. This would mean, for example, that a watch-repair specialist would know perhaps four makes of watches. However, what he knows about those four has 100 percent carry-over to civilian watch repairing, as the Army school course outline shows. The same applies to other specialist training. The discharged serviceman, then, on his return to civilian life, if he would capitalize on the specialty he learned in the service school, should in certain cases be provided with part-time courses by the public schools so that he may have a more complete knowledge to fit the greater variety of equipment he would meet in civilian life. These courses should be of the unit type, each one complete in itself after the fashion of those in the Army. In this way any gaps left in the Army training can be filled by the civilian schools.

Because of the large numbers trained in the armed services in specialties having direct carry-over to civilian employment, the

public vocational schools which train in these specialties should carefully consider whether or not there is need for the training in the light of the tremendous number trained by the armed services. This would apply particularly to such specialties as automotive mechanics, radio repair, aircraft maintenance, and similar ones.

XV. INSTRUCTOR TRAINING

TENS OF thousands of civilian and military instructors took part in training programs ranging from special training for illiterates to the most advanced technical training on the university level. In this connection, however, two important facts should be kept in mind: (1) The armed services lay no claim to having developed any new major techniques or ideas in the area of instructor training. (2) The objectives of the armed services instructor-training program were more limited in scope than are the aims of civilian teacher education.

PRELUDE TO WAR

Prior to 1942 little consideration was given to the problems of training military instructors. During the preliminary mobilization period—September 1939 to December 1941—the armed services followed the usual peacetime policy of assigning to instructional duties those commissioned and noncommissioned personnel who were most thoroughly skilled in their specialties.

Mastery of subject matter and attendant skills was considered the primary qualification for an instructional assignment. The professional training for instructors was given consideration only in scattered training centers and then such training usually was limited to an apprentice type of on-the-job training consisting of an observation and practice teaching period.

Soon after the declaration of war in December 1941, the rapidly increasing rate of induction of personnel into the armed services placed a heavy strain upon the available facilities for training. Training centers soon became overcrowded and training staffs overburdened. The usual methods of training instructors proved inadequate. Speeded-up training schedules did not permit the more leisurely apprentice-type method. Rapid technological improvements in the weapons of war called for the creation and training of a new type of specialist in this field. Furthermore, the unceasing demand for highly trained specialists to man initial combat outfits drained rapidly the supply of potential instructors from training centers. By the middle of 1942

the shortage of qualified instructors had become critical in most of the training centers. It often became necessary to assign advanced students in a course as instructors of the elementary phases of the same course. Under such circumstances there was little opportunity for choice in the selection and assignment of instructors.

WARTIME DEVELOPMENT OF SELECTION POLICIES

It was not until April 19, 1943, that the Secretary of War outlined procedures to be used by Army organizations in selecting instructors. In January 1945 the Navy Department released its standardized *Curriculum for NTSch (Instructor)*, Bainbridge, Flint, Anacostia, San Diego which contained directions relative to the process of selecting instructors. With no specific instructions from their respective departments, the components of the Army and Navy were left to their own initiative in the development of procedures for the selection of instructors.

An element of similarity ran through the majority of the programs of instructor selection, which had the following features in common: (1) Potential instructors were selected and earmarked at an early stage in their technical training on the basis of their qualification cards; (2) those individuals selected as potential instructors were carefully observed and reported on by their instructors at the request of personnel and training officers; (3) potential instructors were called before a committee for an interview to determine their interest in teaching, their general background of experience and training, and general aptitudes for instructor positions.

Pre-Service Training

In general, there were two types of pre-service training programs. In one an effort was made to provide a formal curriculum that would give to all instructors at that particular center the basic fundamentals of methods of instruction that would be applicable to any subject or course. This program varied considerably in scope and presentation. In some instances the writers of curriculums attempted to condense into one volume all of the important principles of learning and teaching, of testing

and evaluation, of administration and supervision, and of human relations, that they found in hundreds of textbooks on educational subjects. This volume was used as a textbook by the student instructors during their short intensive course, "Methods of Instruction." In other instances, the writers of curriculums based their work on the best-known principles of teaching, from a military point of view, using only military publications as their reference materials. Student instructors were processed through the course, which required two or more practice teaching assignments and critiques before they could be assigned to instructional duties.

Programs of the second type varied entirely in their content since they were designed as special curriculums to train for specific instructional assignments. In these programs the student instructors were trained in the various methods of instruction and testing used by the regular instructors in that specialty. For example, student instructors in naval training schools for instructors were trained in the methods used by regular instructors in the fire control school, gunner's mate school, and commissary school. Student instructors in Army Air Forces schools for instructors were trained in the methods used by the regular instructors in the bombardier schools, the navigator schools, the pilot schools. The methods of instruction advocated in all cases were, of course, similar to those advocated under programs of the first type. The essential difference lay in the application of those methods to specific areas or fields of instruction rather than to instruction in general.

In-Service Training

The armed services had an intensive in-service training program for military instructors. Aside from formal refresher courses at central instructors' schools, the program consisted of supervision and counseling. Supervision was of two types, administrative and technical. The instructor's classroom was open to inspection by higher authorities at all times. Inspecting officers were authorized by higher authority to criticize and recommend changes in classroom organization and administration, and in teaching methods and materials. Each instructor

was amenable not only to the inspecting officers of the administrative staff but also to the direction of one or more technical supervisors who periodically checked upon the correctness of the content and skills the instructor was imparting to his students.

Besides administrative and technical supervision, each instructor was observed by members of a supervisory staff of counselors who visited the instructors' classrooms, observed their methods of instruction, and conferred with them privately to offer suggestions for improving their teaching methods. The counseling conferences were intended to aid instructors needing and desiring professional advice, and as a method they were usually welcomed by the instructors themselves.

Typical of the services that members of in-service training staffs performed were the activities of instructor-training officers at Navy training centers. These men assisted the regular instructors in planning classroom and shop layouts, in making job analyses, in drawing up lesson plans, in preparing job information sheets, in developing training aids, and in planning examinations. The services rendered by these officers immediately resulted in the upgrading of instruction at all training centers where they operated.

IMPLICATIONS FOR CIVILIAN TEACHER EDUCATION

Some of the policies and procedures of instructor training have positive implications for teacher education. Many if not all of these policies and procedures already have been adopted by progressive teacher education institutions and forward-looking educational systems. Many other institutions and systems likewise will adopt some or all of them with appropriate modifications to fit the individual situation.

1. *Local Initiative*

Although during the war military administration was necessarily authoritarian, and major changes in content or methods of instruction were either initiated by headquarters or subject to its approval, the emphasis on close and continuous contacts between the instructor-training centers and headquarters made possible the initiation of desirable changes at the level where the

training program actually was carried on. If the change represented a major deviation from former practice, it was reported to higher authority for approval and transmittal to other training centers conducting similar programs. Many of the rapidly instituted improvements actually originated at the instructor-training centers.

Most civilian institutions engaged in teacher education could review profitably their administrative policy in the light of the effectiveness of the armed services instructor-training program operating under the policy of encouraging local initiative.

2. *Selection of Instructors*

The care which certain organizations in the armed services displayed in the selection of instructors was highly commendable. The procedure used by the Army Air Forces in selecting bombardier instructors was probably the most scientific found in the armed services. The position of the bombardier instructor was carefully studied and analyzed to determine the qualifications and training required for the most proficient instructor. Following the job analysis, a group of tests was constructed to use in selecting the candidates from among the returnees who possessed the required qualifications. Then a curriculum that would give the supplementary training that had previously been determined as essential in the production of qualified bombardier instructors was developed. Finally, the policy of eliminating inapt candidates and reassigning them to other positions guaranteed the highest type of instructors it was possible to find.

Civilian educators should carefully analyze the position of the teacher and other educational personnel to determine the primary qualifications, knowledge, and skills that each possesses. Test and measurement experts should be concerned with the development of tests to screen candidates for the teaching profession into each of the categories. Curriculum specialists should plan curriculums that will qualify selected individuals to fill specific teaching positions. Teacher education specialists should not be content to take those high school graduates who come to them as teacher candidates, process them for teacher education, and graduate them to be *just teachers*.

3. *General Education and Professional Education*

During the early part of the war and before, the armed services stressed the mastery of subject matter to the virtual exclusion of pedagogical training in the education of instructors. Eventually professional educators entering the service brought about a more equitable distribution of emphasis between the two. From evidence available it is safe to assume that at no time did pedagogical training consume the major portion of the student instructor's over-all schedule. As a matter of fact, complete mastery of the technical or the subject-matter field was always considered a primary requisite of the efficient instructor.

Training officers discovered that the amount of time normally devoted to the professional phase of the curriculums in many teacher education institutions could be condensed considerably without undue loss of effectiveness in the classroom. The most severe critics of the usual teacher education curriculum within the educational profession had for some time been critically appraising the amount of duplication found among the various courses composing that curriculum, but academic tradition had usually blocked any efforts to eliminate the duplication. Training officers were not bound by such academic tradition; therefore at an early date in the instructor-training program of the armed services much of this unnecessary duplication was eliminated.

It has been shown how the fundamental principles of learning and teaching, normally spread thin over several semesters of professional courses in teacher education institutions, were condensed into a single volume of reference material, and taught intensively over a comparatively short time. Of course, the fact that time was at a premium during the war years necessitated a more intensive condensing of these materials than would be considered wise or necessary during the time of peace. Nevertheless, the final result, as shown by the effectiveness of instructors so trained, indicates that an individual who has complete mastery of his subject matter and shows an aptitude for teaching can become a proficient instructor in a reasonably short time.

A balance between general and professional education should be provided in preparing teachers. Many professional courses

should be condensed and combined into major area courses in such a manner that none of the important elements is lost but the course becomes more valuable to the student teacher.

4. *Visual Training Aids for Training Teachers*

The armed services developed training films, filmstrips, and charts to visualize the teaching process. In this manner, the Army and Navy utilized a training medium that had been developed in the civilian world for recreation and education, but had not previously been utilized to any great extent in the education of teachers. Civilian educators have been high in their praise of the sound motion picture *Military Training* used by the armed services. The picture presented in approximately fifty minutes a fairly complete visualized coverage of instructor qualifications, methods of learning, methods of teaching, methods of testing, and additional minor suggestions relative to teaching practices. Through this picture there were clarified for student instructors the theoretical teaching principles that had been presented through lecture and class discussion.

A commercial producer has already released for civilian use a series of filmstrips and recordings widely used in the Navy instructor-training program: *The Teacher*, *Some Principles of Teaching*, *I Want to Learn*, *The Lesson Plan*, *Make Your Chalk Talk*, *Teaching a Vocation*, and *Designing Examinations*.

Audio-visual aids should prove to be a valuable asset to teacher education. Teaching is an involved process about which educational textbook writers have written millions of words in an effort to present it clearly. Too often with the appearance of each new book the process seemingly becomes more involved. It seems that a series of motion pictures showing expert teachers attempting to bring all of our accepted educational theories to life in the classroom would prove an invaluable aid in presenting the many intangibles of the teaching process. Certain educators are now borrowing prints of the film *Military Training* for use in training civilian teachers, but this will not prove to be the best approach, for this picture was made for the specific purpose of visualizing military instruction for the potential military in-

structor. A new picture or pictures appropriate to the needs of civilian education should be prepared.

5. Effective Oral Exposition

The power of oral exposition was recognized by the armed forces as an outstanding characteristic of an efficient instructor, and the power of articulate expression was found to be a rare quality in the make-up of many potential instructors. Training officers did not throw up their hands hopelessly and attempt to carry on with the subjects at hand. They began looking for methods of improving them. Through a combination of lecture, speech recording and auditing, and constructive criticism, tongue-tied student instructors became in a short time articulate instructors. Men who had never dreamed of standing on their feet and addressing their peers in a few short weeks were lecturing lucidly and conducting lively conferences as instructors with a self-confidence born of the ability to organize and present effectively one's thoughts to others.

The classroom teacher must still depend to a great extent upon words to convey ideas to the mind of the student. Unless the classroom teacher is able to do this efficiently, teaching proves ineffective, and little learning results. It seems that the emphasis placed on effective speech by the armed forces and the effectiveness of their speech development programs point a way that teacher education institutions should take. All teacher education curriculums should provide for the development of more effective oral exposition on the part of every teacher candidate. Those who are unable to measure up to minimum standards of oral exposition should be guided away from the teaching profession. Intensive application of the best thought in the educational world to this program would go far toward revitalizing instruction at all levels of the American educational system.

6. Lesson Planning by Instructors

Training officers in the armed services placed considerable emphasis on a practice that only a few years ago received great emphasis in civilian education. The practice of lesson planning received so much emphasis in certain geographical areas during

the late twenties and early thirties that lesson plans are no longer considered favorably in those areas. Nevertheless, the armed services used lesson plans effectively. During the pre-service training phase of the military instructor's training program, he was required to prepare several lesson plans on materials in the subject area that he was to teach later. The plans were prepared according to regulation form and were carefully scheduled to the minute in order that all important materials would be covered. This method of planning also prevented the instructor from bringing into the discussion any extraneous material that occurred to him at the moment. During the in-service training period—the remainder of his term as instructor—the instructor was required to have and to follow similar lesson plans. Supervisors carefully checked this matter in all classes observed. Lesson planning guaranteed two things: (1) the instructor had to prepare himself thoroughly for the lesson he was to teach, and (2) he had a definite guide to direct his teaching for the day.

In certain areas of civilian education it is not desirable for the teacher to be bound too closely to a detailed lesson plan; in other areas careful planning and timing of instruction would improve and upgrade instruction.

There are no statistics on this subject, but it is a well-known fact that many teachers enter classrooms day after day with little idea of where they are going to start the class discussion, what they are going to discuss during the class hour, and at what point they are going to stop the discussion. More careful preparation for the presentation of the materials, more thoughtful planning for full utilization of every class hour, and less dependence upon impromptu teaching would result in a marked improvement in the caliber of the students that American schools and colleges are returning to their communities.

7. Classroom Administration

Student instructors in the armed services were trained in the mechanics of classroom administration. During the pre-service phase of their training they received instruction and practice in maintaining records required in connection with their teaching activities. School principals and other administrative personnel

have criticized the inadequate training the student teachers have been given in these matters. During the first few months of school the new teacher must usually be carefully coached and supervised in order that registers, cumulative record cards, periodic reports, and student report cards might be properly used. Somewhere in the pre-service training period of student teachers, attention should be given to these auxiliary but necessary administrative details.

8. *Development of Instructor's Personality*

The armed services placed major emphasis on the importance of the instructor's personality. Both the Army and the Navy emphasized personality as a major factor in the selection of instructors. Each devoted considerable time and attention to ways and means of developing the components of personality. Student instructors and regular instructors were constantly impressed with the importance of maintaining in the classroom at all times enthusiasm, neat appearance, physical vitality, poise and dignity, courtesy and tact, patience, and self-assurance—all of which are a part of or contribute to the instructor's personality. Instructors were carefully coached in the elimination of personal mannerisms which detracted from their effectiveness.

The matter of the instructor's personality was considered of such great importance in the success of the student that the Eastern Flying Training Command, Army Air Forces, attempted to match students and instructors according to their personality characteristics. The instructors were typed as thorough, systematic, impatient, or firm; and the students were typed as highly sensitive, slow to learn, cocky, or temperamental. Efforts were then made to assign students to appropriate instructors on the basis of these personality judgments.

Civilian teachers who have pleasing personalities usually secure and hold the most desirable jobs, which is sufficient proof that the importance of personality is recognized by employing officials. Teacher education institutions should guide away from teaching the individuals who lack those personality traits considered essential to the successful teacher.

When the armed services needed leadership, leadership train-

ing situations were devised and men were required to participate in the activities which were planned to reveal leadership qualities. Similar situations for the identification of desirable personality traits may be developed in teacher education institutions.

9. *Supervision and Counseling*

Much of the effectiveness of military instruction within the schools of certain arms and services was directly attributable to the continuous in-service training program. The professional growth of the military instructor was not allowed to stop upon his completing the course "Methods of Instruction." Staffs of technical supervisors were always available to lend their aid in connection with problems of a technical nature and to insure that the instructor was effectively presenting the technical material of his course. Counselors dropped into the instructor's class frequently to observe his teaching methods. After class, a conference between counselor and instructor was held, during which time helpful suggestions were given, strengths were praised, and weaknesses were constructively criticized. Both the technical supervisor and the professional counselor were available for additional conferences upon request by the instructor feeling the need of aid. These large staffs of supervisory and counseling personnel increased the *per capita* cost of instruction considerably, but the continued improvement of instruction justified the additional cost. This system of in-service training applied to instructors at all levels from the basic courses through the most advanced technical courses. The picture was different at the unit training stage, where the instructors were the officers of the units.

Today a tremendous shortage of qualified teachers exists throughout the country. Inadequate numbers of high school graduates are entering teacher education institutions. This situation will result in a continuing shortage of teachers for some time to come. Those who have been teaching on emergency teaching permits must carry on in order that the nation's classrooms will be staffed. If instruction in American schools and colleges is to be upgraded during the next decade, it must be accomplished through an in-service program of supervision and counseling to promote the professional growth of teachers now

on the job. Effective counseling and supervision are needed at all levels of our educational structure.

10. *Instructor Visitation*

Another phase of the armed services in-service training program taken from civilian education but more widely utilized in military training was the frequent interclass, interdepartment, and field visitation program. Training officers not only encouraged such visitation, but certain organizations went so far as to direct that instructors visit field installations for temporary periods of duty. This policy was adopted in order that instructors would be thoroughly familiar with current field practices in the areas in which they were instructing, and that they would serve as consultants to field installations in need of expert guidance. This policy of frequent visitation by instructors to other instructors' classes within and without their own departments resulted in an exchange of the best ideas and methods of instruction within the service. The policy also insured that the students received the latest information and were trained in the most recent practices.

Many civilian educators long ago adopted the policy of permitting public school teachers to visit the classrooms of outstanding teachers within the system or in other school systems for the purpose of securing new ideas and learning new methods of teaching. Also, certain progressive teacher education institutions have cooperated very effectively with public schools. Representatives of these institutions have furnished consultants who went into the field to assist with programs that were planned to help bring about the improvement of the teacher on the job and the upgrading of instruction in the geographical area served. Summer and after-school-hours workshops have been conducted on and off the campus by these same representatives for teachers who could avail themselves of the opportunity.

The expansion of a policy of intervisitation and interexchange of ideas should result in an over-all improvement of instruction at the college level and at the public school level, if the successful experience of the armed services can be accepted at face value.

11. *Instructor Recognition*

Instructors who did an outstanding job of teaching or showed marked initiative in the development of instructional aids or methods were given due recognition for their efforts. In the armed services there were various ways of providing this recognition: promotion in grade and increase in salary; promotion to a position of greater responsibility and prestige; public recognition by official adoption and publicizing in service journals of the new aid or technique; and publication of official citation for the job well done. It was found that such recognition of individual initiative proved a strong factor in motivating other instructors to improve their methods of instruction and develop new instructional aids and techniques.

Many teachers on their own firing-line have developed new and effective means of coping with problems common to the teaching profession, but too little recognition and publicity have been given to their efforts. As a result, the profession as a whole has never profited from their successful efforts. It is possible for the teaching profession to find a satisfactory means of rewarding members of its group for outstanding contributions to the American educational system.

12. *Instructor Shortages*

At various times during the war, the armed services were faced with very critical shortages of qualified instructor personnel. Training officers attacked the problem with vigor, and in many instances were able to provide the much-needed instructors in a relatively short time. The records of available personnel were scrutinized carefully, and those individuals who were technically qualified were selected for short intensive courses in methods of instruction. During these courses, those individuals who showed marked aptitude for instructional duties were selected and assigned to instruct under close, expert supervision. In this manner many persons who had never attempted teaching before developed into exceptionally good instructors.

Part Five

**THE ROLE OF THE UNIVERSITIES
AND COLLEGES**

THE ROLE OF THE UNIVERSITIES AND COLLEGES

1. The installation of training detachments of the armed services in some six hundred civilian colleges and universities during the war afforded one type of opportunity for these institutions to make a direct contribution to the war effort, and provided stimulating experiences in the housing and feeding of students, the acceleration of instruction, and the cooperative development of curricula.

2. The learning of modern foreign languages, directed toward sharply defined functional ends, as it was in the college training programs of the armed services, suggests that unprecedented speed in acquiring an alien tongue may be attained in intensive courses in a planned environment, making use of native informants and mechanical recordings, and that mastery of the vernacular may well be a great aid in the study of foreign literatures and cultures.

3. The concurrent study of all essential features of a regional culture, including the language, as in the "language and area" concept developed in the Army Specialized Training Program, carried forward into practical operation a doctrine long subscribed to by many college teachers, but which had formerly been but little more than a utopian theory in many institutions.

4. The armed services experience with the teaching of language and area studies in the colleges produced a healthy ferment and a widespread new interest among colleges and secondary schools, and a fresh hope that a quicker and more thorough grasp of foreign languages hitherto regarded as difficult, and a more practical understanding of foreign peoples and their cultures, are attainable for American students in secondary and higher schools.

5. The far-flung scientific research undertakings carried on under contracts between the armed services and numerous universities during the war, and their spectacular productivity, point unmistakably toward the adoption of national policies relative to the organization and financing of research in the public interest. Nation-wide organization and national participation in financing are desirable, but care is necessary to preserve individual freedom of scientific inquiry and freedom of communication among scholars and scientists to the maximum extent that the national security will permit.

XVI. WARTIME COLLEGE TRAINING PROGRAMS OF THE ARMED SERVICES

WHEN THE history of World War II has been fully recorded, it will undoubtedly contain a section devoted to the contribution made by American higher education to the training of specialized personnel and to the conduct of research essential for military effectiveness. Both the Army and the Navy realized early that a technological war could not be won without trained men to operate the intricate machines of combat. Furthermore, it was publicly announced by the military that their own resources, both teaching staff and equipment, would not be adequate to meet the situation. Consequently, colleges and universities throughout the country were pressed into service between 1942 and 1945 to aid in maintaining the continuous flow of trained men needed in the field by all branches of the armed services.

Although the armed services college training programs are dwarfed by the present postwar enrollment of veterans studying under the provisions of the Servicemen's Readjustment Act (GI Bill of Rights), never before in the history of higher education had such a democratic or effective use of collegiate resources been made to provide the basic technical and professional training required of specialists in wartime. Another contribution to the success of the various training programs was the federal funds supplied to do this job. Never before had so much money to do so tremendous a task in so short a time as was provided by the sponsors, the War and Navy Departments, been available to our educational institutions. The records show that during the three years of its existence, the Joint Army-Navy Board for Training Unit Contracts expended well beyond 300 million dollars.

In spite of the delay in training prior to the inception of the Army Specialized Training Program (ASTP) and the Navy V-12 Program, which were not initiated until the spring and summer of 1943, approximately eight hundred contracts were made with educational institutions for the various types of

training. Tabulated below is an indication of the degree to which American colleges were employed for that purpose.

Branch of Service Contracting Schools	No. of Schools Contracted
Army	122
Army Air Corps	155
Navy	148
Army and Army Air Corps, jointly	87
Army Air Corps and Navy, jointly	13
Army and Navy, jointly	96
Army, Navy, and Army Air Corps, jointly	42
Total	<u>663</u>

As facilities were prerequisites, only the larger institutions were awarded more than one training unit contract. In addition to the numbers given above, more than a hundred contracts for research projects were made with certain schools under the general supervision and control of the Office of Scientific Research and Development, wherein the primary motive was to develop scientific devices and techniques to secure the eventual capitulation of the enemy at the lowest cost to our military personnel.

Inasmuch as the scope of this study is limited to the military-sponsored programs, omitted here are analyses of the contributions to postwar education of such training programs as the Engineering, Science, and Management War Training program operated under the auspices of the U. S. Office of Education; the Cadet Nurse Corps program conducted by the U. S. Public Health Service; and the civilian pilot training program administered by the Civil Aeronautics Authority. However, it might be added that these civilian programs, which trained hundreds of thousands of young men and women in skills essential to a successful prosecution of the war, have supported a belief in the effectiveness of higher education in a period of national emergency.

The flexibility achieved in the college curriculums during the war crisis bears testimony to the facility with which the thousands of loyal teachers adapted themselves to a new assignment, and is a tribute to those who met the challenge for service to their country without fanfare or public acclaim.

The various types of training unit contracts indicate three general classifications into which contract schools might be grouped:

1. For *college instruction* wherein the institution provided instruction at the collegiate level; *i.e.* Oriental languages, engineering, ASTP, Navy V-12 Program, medicine, dentistry, military government, veterinary surgery, meteorology, statistics, psychology, etc.

2. For *military instruction* wherein the armed services supplied the instruction and utilized only the physical facilities and housekeeping staff of the institution, *i.e.*, officer-candidate schools (OCS), midshipmen's schools, special service schools, preflight schools, chaplains' schools, Navy indoctrination schools, exchange services, Army administration schools, etc.

3. For *vocational instruction* and other wherein the institution provided instruction at a vocational or technical level, *i.e.*, Diesel engineer schools, pre-midshipmen's schools, U. S. Military Academy preparatory schools (USMAP), naval aviation refresher units (NARU) and V-7 refresher units, motor maintenance, telegraphy, welding, etc.

While it is true that there were many and varied types of college training programs, each with its specific objective and level of instruction, the two best known to the civilians of this country were the Army Specialized Training Program and the Navy V-12 Program. These two programs followed the accepted pattern of college education, using accelerated curriculums, and they employed the regular college instructional staffs.

EMERGENCE AND INCEPTION OF THE COLLEGE TRAINING PROGRAMS

Utilization of colleges and universities by the military had its origin in World War I when, for a few brief months, a college training program known as the Student Army Training Corps (SATC) was found on 525 college campuses. Its relatively short existence did little to pave the way for the organization of any service by the colleges in World War II.

In September 1940, as the Axis powers invaded neighboring countries, President Roosevelt affixed his signature to the Selec-

tive Service Act. While the Battle of Britain was being waged, every physically, mentally, and morally fit male in the United States between the ages of twenty-one and thirty-six became subject to classification and induction for military training. Although the majority of America's college students were unaffected by the initial draft law, they became restive and indisposed to remain at their studies. As enlistments increased, college enrollments dwindled sharply. During the late summer of 1940 the National Guard was federalized and called to active duty; and shortly thereafter the first selectees began to pour into the Army reception centers, then only partly prepared to receive them.

During this period of national emergency the student reserve corps programs were operative on most college campuses. Following the Japanese attack upon Pearl Harbor, instruction in military science at ROTC and NROTC centers became exceedingly important. Nonmilitary-minded students suddenly woke to the need for becoming identified with one of the military programs. As clouds of war blackened and our involvement seemed certain, both the Army and the Navy launched aggressive campaigns to procure men to fill established quotas for each program. Student reservists who enlisted were placed on inactive duty, pending the exigencies of war, and with civilian status were permitted to continue their academic work except for slight modifications in their curriculums.

Although quotas for the reserve programs were established on the basis of long-range needs, the War Department and the Navy Department considered the student reserve programs inadequate to produce the number of technically trained men required by a global war. The continued prosecution of the war demanded a reorganization of the Enlisted Reserve Corps (ERC) programs and a coordinated plan for employing college faculties and facilities. As the question concerning the highest utilization of American colleges was being deliberated, the War Department was faced with acute shortages of manpower, a reservoir of which existed in the colleges. The inactive duty status, a proviso under which students had been moved to enlist in the ERC, was rescinded by the War Department, and Army

reservists were assigned to training centers. Had the Navy done likewise there would have been little dissatisfaction among the men, some of whom believed the War Department had a moral obligation in continuing its college program. Notwithstanding, the Navy students in the V-1 and V-7 programs were permitted to continue their inactive status until the summer of 1943 when they were assimilated into the new V-12 program. In anticipation of the bleak days that lay ahead, several meetings were called by national educational associations to determine ways and means by which higher education might contribute most effectively to the war effort. Resolutions were drafted and submitted to the federal government pledging the total resources of American higher education.

Following these conferences, college courses were accelerated and a coordinated nation-wide effort was made to enhance the physical stamina of all civilian students under instruction. Many months of negotiations between civilian educators and the armed services were finally terminated on December 12, 1942, when a joint statement was issued by the War and Navy Departments establishing not only the armed services policies for training specialists and officer candidates in nonfederal educational institutions but also the techniques by which the personnel were to be selected and trained. Without delay, the Army-Navy War Manpower Commission Committee began to select the institutions equipped to provide training. Many institutions lacking technical facilities and housing necessary for trainees were eliminated from consideration. Those selected were cleared for action.

Army Specialized Training Program

The ASTP was initiated in March 1943 with the assignment of a limited number of trainees to the colleges; and the peak enrollment was reached in December of the same year when approximately 140,000 soldiers were under instruction in about 200 institutions. In February 1944 the program was suddenly curtailed because of the need for infantry replacements, a situation that was explained by General Marshall as follows:

The Army's manpower balance had been disturbed in the fall of 1943 by shortages in deliveries of inductees by the Selective Service System, which amounted during one 3-month period to about 100,000 men. A second factor was the miscalculation after North Africa that resulted in too many men being trained for the armored forces, the artillery and special troops, and too few by far for the infantry.

Since the program continued with modified quotas, the primary function of the ASTP became one designed to train "non-coms" and enlisted men for responsibilities that required leadership and specialized abilities.

Navy College Training Programs

In the Navy, the launching of the V-12 program was less hurried than the launching of the ASTP. Curriculums and administrative details were carefully developed between December 1942 and July 1, 1943, when the program was instituted at 131 colleges and universities, exclusive of medical, dental, and theological schools. Like the ASTP, the Navy program reached its peak enrollment in the autumn of 1943, when 84,379 V-12 trainees were pursuing undergraduate studies and an additional 6,667 were enrolled in medicine, dentistry, and theology. Unlike the ASTP, there was no sudden curtailment of the V-12 program. Navy demand schedules were less affected by the fortunes of war, for the measure of the Navy's training success depended upon the availability of trained men to man the ships and planes that industry was producing on schedule. The V-12 program therefore became an integral part of the Navy's long-range plan to provide Naval Reserve and Marine Corps Reserve commissioned officers who would be called upon to perform a wide variety of duties both ashore and afloat.

During the first year and a half of the war, manpower needs in naval aviation were constantly stepped up. To meet the demand quotas it was necessary to lower the educational prerequisites, which normally required aviation cadets to have a college degree. By the spring of 1942 the Naval Aviation Cadet Selection Boards were procuring men directly from high school. By the summer of 1944, however, a backlog of V-5 aviation cadets had been produced by the 136 basic and ad-

vanced air training schools, which had an average attendance of 35,000 men and an output of 1,700 every four weeks. Each cadet averaged from eighteen to twenty-four months of intensive training at an estimated cost of \$30,000. When the mortality rate in the Pacific theater proved much less than had been anticipated, the Deputy Chief of Naval Operations for Air became interested in upgrading the academic ability of the cadets. Gradually all V-5 cadets were required to take two semesters of the basic V-12 curriculum and later three semesters, before they were assigned to aviation training. As combat losses continued to be much below the original estimates, DCNO (Air) agreed that as of November 1944 all V-5's then in their first three semesters of college should be assimilated into the V-12 program. Thereafter the two classes of trainees were merged.

The Naval Reserve Officers' Training Corps (NROTC) was originally established in 1925 by act of the Congress. By July 1, 1943, at the inception of the V-12 program, NROTC embraced twenty-seven colleges and universities. It, too, became amalgamated with the V-12 program as one of the upper-level curriculums into which carefully selected trainees were screened.

Thus, by absorbing the old V-1, V-5, and V-7 programs, and by retaining the NROTC as the core of the new V-12 program, the Navy was able to organize one distinct college training program rather than operate several simultaneously.

Air Forces College Training Programs

Independent of both the ASTP and the Navy V-12 program were the Army Air Forces College and Meteorological Training Programs, which used a total of 205 colleges and universities. The greatest number enrolled in these programs at any one time was 83,466 aviation cadets and enlisted reservists, in April 1943.

During December 1942, Headquarters, Flying Training Command was forced to decide what should be done with the backlog of 90,000 Air Corps enlisted reservists, many of whom had been waiting several months for active-duty calls. One means whereby this pool of human resources might be retained as an insurance against combat reverses and also be protected from

possible questioning by Selective Service and the War Manpower Commission was to create a college training program. This was hastily agreed upon and a program was devised to give cadets academic training and "diminish the individual differences in educational background for subsequent aircrew training."

The opportunity to obtain students appealed to many of the smaller colleges that had not given ASTP and V-12 programs. Some of these colleges were faced with no other alternative than to close for the duration. The program, as originally outlined by Headquarters, Flying Training Command, called for intensive training in mathematics, physics, geography, history, English, civil air regulations, and medical aid. Cadets who indicated through examination a proficiency in any of the prescribed courses named above were excused from it, provided that they were carrying three basic courses. This decision was changed in November 1943, when cadets were required to take all courses in the curriculum.

The flow charts for the program called for assigning to college units 35,000 cadets on March 1, 1943 and 35,000 in April. Because of the haste in which the program was conceived it suffered many administrative weaknesses and a lack of understanding of objectives on the part of cadets, instructors, and officers in charge from which it never fully recovered.

A certain degree of uniformity of instruction was effected, however, before the termination of the program in June 1944, as the outcome of a series of conferences of college officials who met voluntarily to discuss ways and means of standardizing the methods and content of the curriculum.

Cadet Meteorology

In the spring of 1940 as the German troops were swarming into Denmark, Norway, Holland, Belgium, Luxemburg, and France, the air arm of the United States Army had fewer than three dozen trained meteorologists. As late as midsummer of 1940, when the battle for the northern African coast was taking its toll in British lives, the General Headquarters Air Force had but one officer assigned to weather forecasting duty. This discrepancy was apparent to General Arnold, Chief of the Air

Corps, who ordered that measures be taken immediately to surmount the shortage.

Five universities with recognized curriculums in meteorology were selected to provide the necessary training in October 1940; however, the acute shortage of trained forecasters following our entry into the war caused the AAF officials to institute a much more ambitious program. During 1943 the facilities of the five institutions were expanded to the point where a new class began instruction every twelve weeks, and the length of the course was shortened from nine months to thirty-three weeks, divided into three terms of eleven weeks each. The intensive program required cadets to spend ten hours a day, six days a week, in attending scheduled classes and in supervised study. For each hour of course lecture, approximately two hours were spent in model weather stations and in laboratories. Academic standing was determined through weekly examinations and a final test.

In the fall of 1942 it was estimated that 10,000 forecasters would be needed by the Air Forces by 1945. Additional facilities were contracted for at additional colleges, and steps were taken to alter the educational prerequisites and length of the training program. These decisions were predicated upon the general knowledge that there was an insufficient number of young men in the country to meet the qualifications for the advanced program. It was contended that the only way to provide the number of trained weather officers needed was to create premeteorology programs wherein different levels of instruction would be offered, thus permitting students with varying backgrounds to prepare for the advanced course.

With this drastic revision of the program, three levels of instruction were organized and labeled the "A," "B," and "C" courses. A student entered course "C" as a private after high school graduation. To be admitted to the twelve-month "C" course, a man must pass the physical examination, be between eighteen and twenty-one years of age, and have had two years of high school mathematics and one year of science. For admission to the "B" course, a man had to be within the age group eighteen to thirty years, meet the same physical requirements as reserve Army officers, and have satisfactorily completed

college mathematics (college algebra, trigonometry, and elementary analytical geometry) and college physics. Students in this six-month course were also privates. At the advanced level, in the "A" course, the status of students was changed to aviation cadets; and, if successful, they were commissioned in the reserve.

The success of the premeteorology courses can be directly attributed to the efforts of the permanent subcommittee of seven college professors from the University Meteorology Committee, which met periodically to standardize the academic program and to determine ways in which curriculum integration could be implemented.

GENERAL CHARACTERISTICS

In many respects the Army and the Navy college training programs were similar. They were intended as schools for potential officers. Time proved, however, that relatively few ASTP men were admitted to officer-candidate schools, since those graduated from the program had to compete with all other enlisted men for selection to fill the limited OCS quotas. This situation resulted primarily because the officer-candidate schools had, by the time ASTP men were available, already trained or admitted the majority of the officers needed by the Army. In consequence, many ASTP trainees who optimistically had expected to become commissioned officers were diverted from their objective, reclassified, and assigned to the infantry as privates. In direct contrast to this situation, trainees in the V-12 program were continuously considered officer-candidate material, and all who remained in good standing were permitted to proceed toward their specific objectives.

Similarities

In both programs the service contracted with the civilian institutions for instruction, use of facilities, subsistence of trainees, maintenance and operation, medical services, textbooks, and trainee equipment. The plan was to select students for these programs by giving recognition to individual merit, potential leadership, previous training and experience, as well as to scores on the oral and written tests. The qualifying test for the

ASTP and the V-12 programs was the same for civilians. Those selected were placed on active duty, given uniforms, and indoctrinated. ASTP trainees received basic military training before assignment; V-12 trainees received it while under instruction. Trainees were paid the monthly base pay of enlisted men and were placed under military discipline. Those who maintained satisfactory military and academic standing were retained under instruction; those who failed to demonstrate officerlike qualities or academic ability were separated promptly.

Both services emphasized mathematics, physical sciences, and engineering in their basic curriculums; both had advanced curriculums in numerous fields of specialization; and both had established techniques for screening men of merit into upper phases. These programs stressed physical fitness and military training in addition to the intensive and accelerated course schedules. The maintenance of academic standards was the joint responsibility of the instructional staff, the college administration, and the officer in charge. The services established a policy of never separating a trainee on his own request. Just so long as a man had a duty status, it was expected that his effort and his responsibility would be equal to that of a man in combat. Had it been otherwise, all who were academically successful could have been accused of evading battle.

Since the Army and the Navy programs utilized existing civilian faculties as provided by the contract institutions, responsibility for the administration of each unit was divided, with the commanding officer having primary responsibility in matters of finance, supply, military discipline, orders of the day, and health and welfare, and the contracting school having as its major responsibility the academic phases of the programs.

Differences

In almost all other respects the programs differed. The ASTP was much more affected by the exigencies of war than the AAF aircrew or Navy V-12 programs. The army found that its need for particular types of trainees changed with combat needs in shifting theaters of war, a fact difficult for civilians to appreciate, particularly those who failed to realize that the pro-

grams were planned to meet the expressed needs of the arms and services.

ASTP curriculums introduced at the inception of the program had to be modified; others were added or dropped in keeping with fluctuating demand schedules. As has been pointed out above, the program was liquidated, excepting professional curriculums, in 1944 when the Army Ground Forces failed to receive its share of men with high intelligence and leadership ability.

In the development of curriculums, the Navy adopted the standard college sixteen-week term with trainees permitted to enroll with civilian students in established courses that met requirements. The Army's decision was to use the shortest time period in which satisfactory curriculums could be prescribed; twelve-week terms were combined into a basic program and a series of advanced programs. The starting dates at the contract schools varied; some units were activated on March 1, others on April 1, and still others on May 1, 1943. In this way, the Army was able to assign trainees as they became available at induction centers or through replacement training centers, which contrasted with the Navy's system of receiving a new increment every four months. The ASTP basic program consisted of three twelve-week terms with most of the entering students undergoing the same instruction in classes reserved for trainees. Variations occurred in the second and third terms, depending upon the interests and abilities of individual men. Those qualified for advanced work were, at the conclusion of the basic program, screened into specialized fields, where the work was also on a twelve-week basis and the number of terms varied according to the field in which the soldier was specializing.

In contrast, the Navy allowed its men with advanced academic standing, who were classified "irregular," to continue their education in the fields of their majors, except in the case of certain prescribed courses, and to remain under instruction for a period in keeping with the sliding scale of allotted terms. Only incoming freshmen, classified "regular," were required to take the fully prescribed V-12 curriculums. All successful naval trainees were permitted to state their preferences as to institutions to which they desired to be assigned, and these were respected to the degree with which it was administratively possible

to comply. The V-12 trainees were also permitted to express their choice of a preliminary course of study, and to specify the branch of naval service they desired; however, their assignments were contingent upon established quotas and competence in their particular fields at the time of graduation. To a degree, this was also true in ASTP, but transportation and available assignments were controlling factors in the situation.

The Army defined its program in terms of "contact hours," with a ratio between contact and study hours differing from that established in civilian schedules. Fifty-nine hours of supervised activity a week was the average work load of an ASTP trainee; twenty-four hours (minimum) of classroom and laboratory work, twenty-four hours of required study, five hours of military instruction, and six hours of physical instruction. The Navy required each V-12 student to carry a minimum of seventeen academic credit hours of work, in addition to physical training, military duties, and drill. Both the Army and Navy programs were geared to consume from fifty to sixty hours of concentrated effort each week, with no respite except for a few days between terms. In this respect, these programs were accelerated and much more intensive than the normal civilian schedules.

FOREIGN AREA AND LANGUAGE STUDY

The ASTP area and language curriculum was one of the lesser programs in point of numbers involved, but one which gained a large amount of publicity—in fact, more publicity than any other educational phase. Other Army and Navy programs in area and language study were located in colleges and universities at various places, and since they were designed for special purposes, they can be considered more or less interrelated.

Early in the war—in fact, before Pearl Harbor—the armed services, in one form or another, were aware of the need for men with a working knowledge of the languages and peoples of many regions in which it was possible that the course of the war would take them.

Men so trained would be needed in the Office of Naval Intelligence in Washington, on duty at naval stations in the Pacific or on ships roaming the seven seas, and in the Army Air Forces,

the Military Intelligence Service, the Provost Marshal General's Office, the Signal Corps, and in all arms of the Army Ground Forces. To satisfy the needs of these various services, the Navy Oriental Language School was established at Boulder, Colorado, with an overflow at Stillwater, Oklahoma, and the foreign area and language program was created by the Army as a major part of the advanced phase program of the ASTP. Languages were also made a part of the Military Government School at Charlottesville, Virginia, and the Civil Affairs Training Schools which were an outgrowth thereof. The Military Intelligence School had its own special program but its objective was more limited.

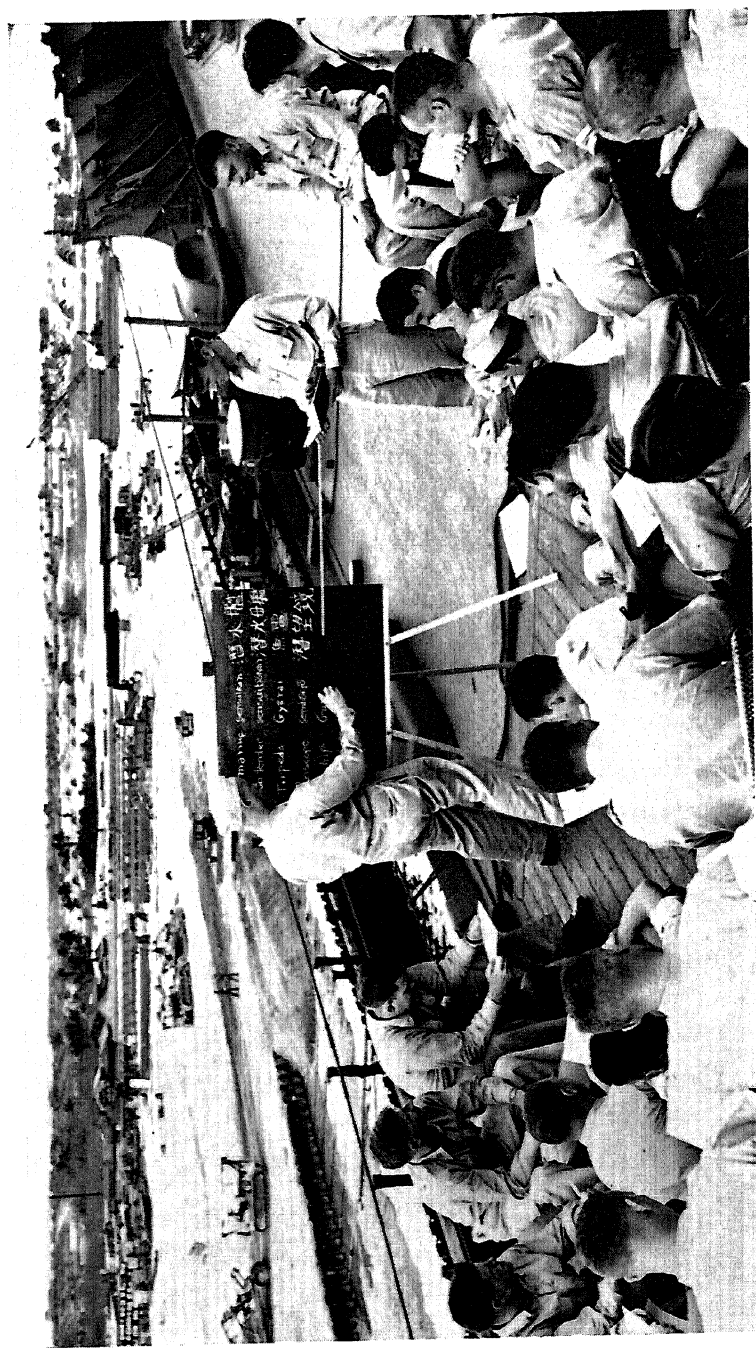
With the exception of the latter school, a common interest of the various services was that the officers and men be able to speak and understand a foreign language, know the area in which the language is used, and in general have an understanding of the conditions within a given country which might conceivably favor or endanger relations between the services and the people whom they were to govern or in whose midst they were to live, temporarily at least, whether it be enemy occupied territory, or that under Allied control.

The scale on which this enterprise was established is best shown by an enumeration of the languages that were studied, especially if one bears in mind the related area program which was to accompany the study of the language. Every remote corner of the world is brought to mind by the following list: Annamese, Arabic (Moroccan, Syrian), Bengali, Bulgarian, Burmese, Chinese (Cantonese, Foochow, Fukien, Mandarin), Czech, Dutch, Finnish, French, German, Greek, Hindustani, Hungarian, Italian, Japanese, Korean, Malayan, Norwegian, Persian, Polish, Portuguese, Russian, Serbo-Croatian, Spanish, Swedish, Thai, and Turkish. Some of these languages had never been taught before in American universities.

Area study, as the Army envisaged it, was practically a new venture, especially with emphasis placed on teaching the purely contemporaneous aspect of the region under examination.

The origin of these programs is traceable to the Office of the Provost Marshal General and the Columbia University faculty,

PLATE II



U. S. Navy Photo

NAVAL OFFICERS STUDYING AN ORIENTAL LANGUAGE

where the programs were conceived. The Military Government Division laid the ground to secure an area and language curriculum in the Army Specialized Training Program and, later, one in the Civil Affairs Training Schools. Shortly after the beginning of the war for the United States, both the Army and the Navy realized that many officers and enlisted men would be required to handle the delicate problems of military government in occupied territory. Personnel would be required to take over control of the conquered territory immediately after the Army or Navy landed, and further personnel, possibly civilians, would be required to continue this control after the armed forces had moved on to further conquests.

In general, it was understood that the Army would have jurisdiction in large land areas, such as Japan itself, and the Navy would have control in the islands of the Pacific. This difference in control and military government interests of the two main arms of the services explains in large measure the essential characteristics of the respective schools that were eventually established.

The Navy, for the most part, concerned itself with training personnel who would organize local governments in the numerous islands over the vast stretches of the Pacific, where they would have to deal primarily with primitive peoples. The Army, on the other hand, concerned itself with training personnel who would eventually provide temporary military governments in large land areas—in Europe, for example—where problems similar to our own are encountered. Actually, the Army established training programs for both Europe and Asia.

The various schools that were established—the Navy School of Military Government and Administration, the Army School of Military Government at Charlottesville, the Civil Affairs Training Schools, the Company Officers School, first at Fort Oglethorpe, Georgia, and later at Fort Custer, Michigan—had somewhat similar training programs, both with respect to military tactics and military government, and to the more or less academic studies established to complement the military side of the training. In addition to the basic military training, there were courses on International Law of Military Government,

Public Administration, Labor, Police Functions in Military Government, Military Courts, Economics and Finance, Peoples and Customs, Tropical Sanitation, Public Health and Hygiene, and related topics involved in the feeding, housing, clothing, the handling of displaced persons, prisoners, and enemy nationals who might be found seeking protection there, and in the general welfare of the people to be governed. The language of the territory to be governed must also be known. It was desired not only that the personnel be competent speakers of the language, but that they be able to understand it as spoken by the natives.

The schools mentioned above, however, were concerned principally with training officers who would actually be responsible for meeting whatever situations should arise, and be ultimately responsible for the solution of the problems encountered. It was believed that, in addition to this special group of men, a larger group would be required of nonofficer rank to assist them in their tasks. For this larger group the foreign language and area program of the Army Specialized Training Program was created.

LESSONS FOR CIVILIAN EDUCATION

It is primarily in this ASTP program that the implications for civilian education are to be found, since this program, the largest of all those dealing with language and area study, is most representative of what the armed services sought to do. Though the foreign language and area program of the ASTP was originally requested by the Provost Marshal General's Office and the curriculum was first adapted to meet the needs of that office, later it developed that all branches of the services were making demands on the Army Specialized Training Division to suit their respective needs. Except for slight changes, however, the program remained much the same throughout its brief existence.

1. *Methods of Instruction Applied to Language and Area Teaching*

The chief interest of the wartime language training concerned the oral skills. Emphasis was placed on teaching the trainee to speak the language "fluently, accurately, and with an acceptable approximation to a native pronunciation." The objective also

implied that "the student will have a practically perfect auditory comprehension of the language as spoken by natives." To achieve these ends, intensive courses were established requiring fifteen to eighteen contact hours a week, handled by senior instructors and informants or drill-masters, who were speakers of the language. Large sections were organized for instruction in the structure of the language by the senior instructor, and smaller sections of 8 to 10 were organized for drill sessions where the language was to be in use at all times. In some cases, the student-teacher ratio was as low as one to two or three in the Navy Oriental Language School. Most of the learning was done by mimicry-memorization based on conversational scripts which were handled by the drill-masters.

The drill sessions were so arranged that the students were forced to take a more active part in the classroom than is normally true in classes where the grammar-reading approach is employed. After the drill-master had recited or read the script a sufficient number of times, the students were divided into two groups of four or five and they rehearsed with each other the material at hand. Later they were divided into five groups of two each and they conversed with one another, still repeating the material for the day. This constant rehearsal of a small amount of subject matter, first presented by the drill-master and later taken up by the small group of students themselves, the grammar for which had been presented earlier by the senior instructor, is largely responsible for the success that was claimed for the courses. The fact that the courses were intensive, and were limited to language study, except for the area study which complemented the language, is another reason for this apparent success.

There was some rotation of teachers, periodically scheduled, so that the students were subjected to a wide variety of inflections and intonations, as well as different teacher personalities. Supervision of the courses was the job of the senior instructor, and the drill-masters observed the classes where the presentation of grammar took place, and when this type of observation and supervision was an integral part of the curriculum, the program was nearly always better.

2. *Training Aids*

The language and area programs were supplemented, in varying degrees, by the use of numerous audio- and visual-training aids on a much wider scale than is normally the case for civilian education. The armed services called upon all branches of the government, as well as upon industry, to assist in locating and making available a vast amount of printed material and mechanical devices.

Since many institutions secured films in considerable numbers for local use, and since many more asked the ASTD to secure films for both language and area instruction, the Army undertook a considerable survey to secure them. Some of these were made available through the Office of Strategic Services, the Office of the Alien Property Custodian, the Museum of Modern Art, the Provost Marshal General's Office, and the Army Pictorial Service. Maps in considerable number and variety were distributed by the Army Map Service.

Federal Communications Commission Reports, containing weekly summaries of foreign broadcasts covering the various theaters of operation, and March of Time recordings were secured and distributed. These, because of their timeliness and their general relation to topics under discussion, were good for the more advanced students who could understand the language.

Civil Affairs Handbooks, Pocket Guides, and Language Guides were also made available. A great amount of mimeographed and printed language-teaching material was prepared for the ASTD by the Intensive Language Program sponsored by the American Council of Learned Societies, which was working in close collaboration with the ASTD.

Extensive use was made of the phonograph for both listening and recording. The recordings that were made to accompany the Language Guides and the basic language texts were supplied in large quantities. These were considered an improvement over the usual recording sets because they were provided with pauses during which the students could repeat immediately the recorded matter. Such a device carries the student beyond mere passive listening, and as such is an aid to the teacher. Recordings of

the lesson materials were made by the drill-master for study and repeated aural review. Some slight use was made of the radio and the telephone, since in the foreign territory the trainees would be confronted with situations where broadcasts would have to be audited, and the telephone would become the main device for oral communication.

3. *Planned Environment*

In no small measure did planned environment contribute to success in the attainment of language goals. This idea is not exactly new for language study; language houses, which are a mild form of a planned environment, have long been in existence, especially in some of the women's colleges. However, the quartering of Army and Navy trainees by language groups, the insistence upon use of the language at table and for all outside activities, and the focusing of the entire physical plant—faculty, students, library, etc.—on one object, namely, that of acquiring a new language, furnish perhaps the clearest example of a planned environment that has ever existed in educational experience.

4. *Developing Testing Tools*

Experiments and experimental tools designed to test the efficacy of different methods of language teaching are now in process of development. The Chicago project, "The Investigation of the Teaching of a Second Language," was established to evaluate current experimental teaching of modern foreign languages in the schools and colleges of the country, largely in the so-called "intensive" courses patterned after the foreign language curriculum of the ASTP. One of the major phases of this educational research project is to develop a testing program for measuring types and levels of skills allegedly imparted through intensive instruction, and to compare the results with those attained in the traditional courses.

In order to measure adequately the worth of intensive versus traditional instruction, a battery of tests must be available in order to test the aural, oral, and reading skills attained in both

types of courses. Standardized tests already exist with established national norms for the testing of reading. For the measurement of aural comprehension and oral facility, the investigation staff has had to prepare new types of tests, for none were available. It is hoped that by administering these new tests over a wide area of subjects and at different levels, some attempt at establishing national norms can be achieved.

Since the intensive course proposes as a primary objective the ability to speak the foreign language, as well as to understand it when spoken, and at the same time adheres to the acquisition of reading ability as a final goal, the investigation should go far to clarify a number of issues. Some of the issues which it hopes to try to solve concern the degree to which the proposed objectives are attained, and whether or not equally good results will obtain for ordinary college students as were claimed for the specially selected and highly motivated service personnel. Another real problem which will require solution, at least for administrators, has to do with the greater number of hours and the smaller classes which were characteristic of the ASTP language curriculum. Are these justifiable in civilian programs? If the investigation can show that students gain greater proficiency through these procedures, then undoubtedly more educational institutions will be willing to make the necessary adjustments.

5. Integration of Courses

On every campus where there was a foreign language and area curriculum, reorganization of the existing academic disciplines was necessary. Both language and area study were under a single coordinator who was in charge of the several course directors and was responsible for the scheduling of classes and examinations and for the integration of the work in area with the work in language instruction. Frequent visits and observations, often unannounced, were the rule.

For area study, a special faculty group was designated to plan the details of the program. Faculty members from widely scattered academic disciplines, such as language, anthropology,

political science, history, economics, geography, among others, were required to assist in the planning and later to instruct in the program. This required to a very marked degree a sense of interdepartmental cooperation not normally conspicuous in academic circles. In some cases, faculty members were assigned lectures they would not normally have given under civilian conditions. Often prepared lectures were submitted for review by the director of a given program, or his committee, and were revised before delivery to avoid duplication in the furtherance of the program.

With the possibility of the creation of new courses of study, incorporating into the college curriculum either areal majors or areal minors, the same type of interdepartmental cooperation must prevail if the courses are to succeed. From a recent survey made by the American Council of Learned Societies, the ground work is being laid for the formation of areal programs leading to both graduate and undergraduate degrees.

In many institutions there still exist separate language departments. In others, the former separate departments have already been combined into one large modern language department. There is a tendency toward interdepartmental reorganization in others.

6. Training of Specialists

For peacetime language and area programs, additional personnel must be trained if the nation is to remain competent even with respect to the minimum number of qualified areal specialists. Many new languages were taught for the first time in American institutions of higher learning. In these more exotic languages, a lack of qualified personnel was revealed. A similar lack was found in the field of area study. The wartime programs were able to count upon a large number of foreigners, usually refugees, who were able to assist in these programs regardless of their qualifications or training as teachers. The training of areal specialists in the postwar period will depend primarily upon the facilities available at the institutions adopting such a program and upon the availability of competent teaching staffs.

7. *Effect of Areal Program on Liberal Education*

An integrated areal program based on a modern cultural region might go far to provide the advantages of the old liberal arts courses centered about classical civilization. With the gradual disappearance of the courses in classical civilization, along with the languages, nothing has ever been developed to replace in the curriculum in any adequate sense the old liberal arts course of study which had for its core the Greek and Latin classics. That curriculum provided the disciplining effect that goes with the mastery of a difficult language, the perspective resulting from a comprehensive study of the great classical writers, and the competence resulting from concentration in a single field. Very few students entering college today are prepared by the schools to undertake such a curriculum.

As a result of the armed services language programs, some colleges may make similar plans for the liberal education of their students. In an effort to make the first two years of college more comprehensive in scope and more stimulating in appeal, some colleges have substituted for the old-time piecemeal curriculum, broad general courses in the fields of science, the social studies, and the humanities. Here the field has supplanted the separate subject. The Army area study classes were trained in a comprehensive understanding of the area to which the men were to be assigned, with the realization that they would not be able to solve the many problems to be encountered unless they were equipped with this broad, basic, and integrated knowledge.

The idea of intensive single courses like the language program of the ASTP may have merit for other academic subjects. The area study program may pave the way for further types of integrated courses, possibly dealing with one's own civilization and culture, to which that of foreign and past cultures can be related in terms of mutual enlightenment. Both would include physical factors, the framework of important historical events, the chief political, economic, and social problems, the great literature and artistic expression, the scientific, philosophical, and religious interpretations of life.

The next chapter will discuss in some detail specific implications of the armed services college training programs for civilian education.

XVII. LESSONS FOR HIGHER EDUCATION

BEFORE the basic implications of the armed services college training programs for civilian education are considered, some attention should be given to the criticism that our American educational system of the prewar period was deficient. It would indeed be unfortunate if certain ideas current during the war period were permitted to remain unchallenged.

A REVIEW OF ISSUES

It was to be expected that certain criticisms would be leveled at American education during the war. On the other hand, the primary lesson to be drawn from the war experience as a whole is that military victory can be traced in large part to the high level of intelligence and character of the personnel available for training, and to the high level of education of the recruits in the armed services. It was not the purpose of this study to ascertain the weaknesses in the American educational system; however, a brief discussion of some of these criticisms relates directly to the lessons which will accrue to higher education.

Was Civilian Education Inadequate?

In girding a nation for war, the War and Navy Departments were faced with the vital task of creating a gigantic training structure for millions of men and women. The success of this training lay in the fact that the services adopted tried and proved civilian educational techniques (there was little time for experimentation) and in the fact that the fighting men and specialists were the product of American education.

Earlier portions of this study clearly indicate that the war brought challenges and opportunities of one sort or another to higher education. For those acquainted with the college training programs it was a pleasure to behold the manner in which classroom instructors and program coordinators met curriculum problems and how readily the established college courses were adjusted to meet changing needs of the military.

Education versus Training

The conversion of our colleges from peace to war created some misunderstanding and misapprehension. As one program after another was launched between 1941 and 1945, the question arose in collegiate circles whether the military-sponsored college training programs would contribute to the decline of the liberal arts.

The military was firm in the assumption that the test of any training program was whether the product could perform well in the field of his specialization, not whether it prepared a man for intellectual freedom. The liberal arts proponents claimed that education, as distinct from training, is as essential in war as in peace. Education, they stated, involved the ability to meet the issues of life with imagination and resourcefulness, the ability to view the present in its relationship to the march of civilization, and the ability to think clearly when faced with complex issues, especially those involving widespread prejudices.

Weaknesses in Fundamentals

The nation-wide survey of college faculties conducted for this study during 1946 revealed the widespread belief among those who had instructed in the programs that trainees were weak or generally deficient in mathematics, science, and language arts and that the secondary schools of the country had done a poor job in teaching these subjects. Nevertheless, there were many who wanted to know: "Did the great bulk of men in the programs who were destined to become infantry, supply, and deck officers, or noncommissioned officers need to develop advanced skills in mathematics and science?" For those trainees who were screened into advanced curriculums, such as aerology, engineering, and medicine, there was agreement as to the importance of comprehending mathematical formulae and their functions in particular fields of specializations. It is evident that in peacetime there will continue to be a need for ability in technological fields if for no other reason than to keep America strong.

ASSESSING WARTIME EXPERIENCE

Considering everything, the war experience ought not to be looked upon as wasted years for higher education. It is true that certain educators harbor a sense of disillusionment and wish to forget the war period as quickly as possible; others view their experiences in a skeptical mood and are inclined to doubt the validity of purported gains to civilian education. These are natural reactions in view of the trials and tribulations encountered by individual faculty members and by the institutions themselves. One need but recall such matters as staff depletion, heavy teaching loads with little if any increase in compensation, accelerated course schedules, additional committee responsibilities, burdensome remedial obligations, and military interference with instruction, to appreciate such disillusionment. One may add, however, that we are still too close to the experiment to prophesy with any degree of accuracy what may be the lasting and tangible gains for higher education.

It is impossible to think of higher education and the responsibilities which the atomic age have imposed upon it except in terms of adjustment and redirection. Since war accelerates social and educational change, in what ways may the war training programs, in the absence of little that is admittedly new, have contributed to the redirection of postwar education?

The war has made higher education increasingly aware of the need for continuing to integrate knowledge. Emerging social developments and the specific needs of the individual in a democratic society indicate that subject matters can no longer be presented in unrelated form and be of greatest value. Undoubtedly, the direction that postwar education will take will be influenced by the major attempts in the armed services college training programs to create a more closely integrated curriculum. The success of several courses—for example, the ASTP foreign language and area studies and the Navy course, Foundations of National Power—may be largely attributed to the nation-wide efforts of college instructors, representatives of many disciplines and academic departments, who were able to break the shackles of traditional departmentalization.

The devices used to foster synchronization are by and large now applicable. Students, particularly veterans, are eager to have their studies so organized that the relationship between courses will be meaningful. To the degree that a student is able to comprehend the values of different methods in education and at the same time be aware of his own opinions, he acquires an appreciation of knowledge in addition to his own field of concentration. Although it is seldom achieved, the ideal situation is to apply what is learned today in mathematics to the problem that will be studied tomorrow in physics, in order to comprehend facts and values in relation to the whole.

Many institutions of higher learning, encouraged by their war experience, are making constructive efforts to help the student form a logical pattern of what he learns. Such attempts are noteworthy and should be encouraged, for the liberally educated man is one who is able to comprehend the relationships between facts and values in the main areas of knowledge.

The intensive and accelerated nature of the college training programs created the major adjustment that had to be made during the war, and affords an impetus to further practical experimentation in time-saving. It is as imperative now as it was during the war that variety and flexibility of programs be provided for the heterogeneous student group now enrolled. During the war, acceleration was primarily an extension of the academic year. Because of this, the term "acceleration" has acquired an unfortunate connotation. As a matter of fact, time in relation to the learning process may be expedited in numerous ways:

1. For the mature student, credit by examination could conceivably become as accepted a method in higher education as credit by course-taking.
2. Greater recognition could be given to the school's responsibility for off-campus experiences that provide continuous growth and sequence to learning.
3. Re-evaluation and reorganization of curriculums, course content, and methods of instruction could result in economy of students' time and contribute to the efficiency of instruction and learning.

4. Techniques could be devised to speed the progress of those students whose social or academic backgrounds do not fit conventional molds, but who are in intelligence and achievement superior to the average student.

5. The present all-time record in enrollment and the long-range trend of increased registration should implement a fuller utilization of the school plant by staggering attendance, by initiating off-campus opportunities, and by intensive special work covering the subject matter more rapidly than the usual class.

6. Carefully selected groups of superior and well-adjusted students could be permitted to proceed at a faster rate. There is less risk of social maladjustment in such groups than there would be for the individually accelerated student.

7. Because of the increase in student enrollments and in the number and variety of educational programs, the need for individual guidance at the college level has increased; facilities for this service can be expanded and refined.

Institutions of higher learning are faced with the postwar responsibility of establishing specific goals and desirable outcomes for their instructional programs. In the basic training courses for servicemen and in the ROTC military science courses, wherein there was no fear of infringement upon academic freedom, both the Army and the Navy worked consistently for the improvement of instruction. In brief, the armed services emphasized the following points:

1. Each curriculum should be designed to meet specific needs.
2. A clear identification of the objectives for each course and each lesson is essential.
3. Adequate testing techniques should be utilized to test the effectiveness of the results of instruction.
4. The various techniques of curriculum building and revision should be studied and developed.
5. Cooperative effort in the production of lesson materials and teaching aids should prove beneficial.
6. No single method of classroom instruction will apply to all situations; a combination of several methods may be used to advantage in a single lesson.

7. There should be frequent application of the principles learned by actual performance whenever possible.

8. Whenever possible, showmanship and humor should be used to vitalize the instruction.

Although many colleges and universities in this country have for decades worked to improve instruction, the fact remains that some of the best and some of the poorest teaching is found in college classrooms. A careful review of course offerings and curriculum objectives is a never-ending process, which requires the wholehearted support of every member of a faculty. Only under such a plan will extraneous subject matter be eliminated. Careful evaluation will result in defining more clearly than in the past what is to be accomplished, and in establishing an educational philosophy that is built upon purpose.

Procedures instituted in the ASTP for promoting supervision of instruction have cracked the shell of the time-honored "sanctity of the classroom," and have opened the sacred precinct of the instructor to view. Many teachers, for the first time, have learned the value of such supervisory procedures as faculty auditing, students' evaluation of instruction, faculty conferences on syllabus construction and revision, joint efforts in test construction and grading, and departmental checking of aims and objectives at periodic intervals.

Unless an interest is given to such matters, and in particular to curriculum goals of instruction, we shall propagate a system which encourages students to nibble at an educational smörgåsbord—a freedom that results only in educational indigestion.

Compensations for academic achievement need to be something more than good grades and paper honors. An important difference between civilian college life and wartime armed services college training was in the expectation that upon the successful completion of a specified course of training the trainee would have the prompt and tangible reward of appointment to a commissioned grade or of an advancement in duty status, pay, and perquisites. With exceptions due to the exigencies of war, this expectation was generally prevalent and generally justified. The Navy college programs, in particular, were officer-training programs. In all cases, the fact of being selected for a period of

college training was generally recognized as being in itself a mark of advancement which could lead relatively quickly to further advancement in the service, if successfully completed. This was a powerful morale factor.

Motivation and morale suffered markedly whenever situations arose in the programs that affected the assignment of graduates, or the exigencies of war blocked the possibility of trainee's putting into actual war use the skills they had worked hard to acquire. Especially was this true when the ASTP was curtailed and men were assigned as replacements in the infantry.

In the wartime programs, more than in civilian life, trainees were subjected to physical and mental conditioning to an extent to which few in civilian life would ordinarily submit themselves voluntarily. Because of the war, individual desires and comfort were secondary. The rugged requirements of the physical fitness program were borne with enthusiasm, yet one wonders whether this type of motivation would be considered valid in normal times.

The armed forces college training programs have demonstrated the value of planning the instructional program at the level of the students' needs and objectives. The outcome of such a program is that it creates for students a sense of direction. It is difficult in civilian education to create incentives that are comparable to those possessed by the armed forces. Of course, there is no magic key, but higher education must make every effort to arrange the course content and the courses of instruction so that they will motivate students to attain their desired and foreseeable aims, cultural and vocational.

Armed services emphasis upon the values of the cumulative record challenges higher education to adopt similar techniques in order to promote student adjustment and coordinate all personnel activities and agencies connected with education and placement. Since leadership and personality criterions were not divorced from the academic, the rating of students on a cumulative basis in all of the positive characteristics was the joint responsibility of civilian and military staffs. The cumulative records, which accompanied each man from the time of his induction throughout his entire period of active duty, proved of inestimable value to each commanding officer when it came time to screen

candidates into fields of higher specialization and to recommend to higher authority those students best equipped to perform creditably in advanced curriculums.

Throughout the entire period of instruction, each trainee knew that since he was hand-picked he must be worthy of the trust. In anticipation of a trainee's assignment to a position of command, men were encouraged through rotation of military duties to gain experience and to evince aptitudes for leadership and devotion to duty. Self-discipline was also encouraged as was the sincere respect for the integrity of others. Repeated failure in this wide range of social relationships resulted in a trainee's separation from a program.

The war experience has demonstrated the importance of a cumulative record for each student and the effect of such a system upon his adjustment and development. When tied closely with guidance and counseling, the system became more than a dead file of pupils' ratings. The wise counselor was not concerned with a few unfavorable entries. He was interested in development and in the gradual disappearance of adverse or negative criticism. The average trainee was interested in his shortcomings and made consistent effort to improve.

Many institutions have for years provided guidance programs whereby students have received personal counseling and guidance based upon interpretation of aptitude and achievement test scores, academic standing, and social adjustment. College educators have long subscribed to the principles of training for social responsibility and for developing emotional stability, but at many colleges little has been done about it. Whether providing "maturing experiences" planned without objective guidance is sufficient, is a question which each institution must decide in the postwar period. The wartime lessons in this area are apparent.

Military discipline is reflected in the postwar behavior of veterans and contributes to the more serious tone of campus life. That a carry-over of wartime discipline is felt upon college campuses where veterans outnumber nonveterans is indicated by articles appearing in the press, and by a postwar study now in progress that will seek to answer the basic question whether military discipline and an appraisal of individual wartime experiences

affect the quality of academic work. Reports show that at campus after campus veterans have set an all-time record in punctuality, in attendance, and in scholarship. The question whether veterans are a healthy influence upon education is being analyzed by many deans who sense a quickening of the intellectual pace on their campuses. They note that the veteran has created an intense atmosphere and a change in student attitude. From all sections come reports that veterans are more respectful, more polite, more mature; never have there been better students. College teachers applaud the serious demeanor of veterans.

Although discipline is the basis of our democratic society, the undisciplined in it resist any tendency toward loss of freedom. Actually the lessons emerging from wartime discipline do not manifest the necessity of instituting unquestioning obedience to rules and regulations; on the contrary, higher education faces the need for a reaffirmation of its aims and purposes, particularly in relation to the obligations inherent in teaching the intrinsic concept of liberty as contra-distinguished from license.

Deeply rooted in the military training doctrine of both the Army and the Navy are the basic principles of moral responsibility. Where in civilian education do we find programs of conduct, embracing entire student bodies, that extol neatness of dress, orderliness of residence, correct posture, social consciousness, dependability, clarity of speech, and personal integrity as worthy attributes of college students? Blind obedience in civilian education is not advocated, yet citizenship in a free society is unthinkable without adherence to established laws. Certainly the responsibilities of a college instructor go beyond imparting knowledge *per se*. "We must build a nation of people who can control themselves, for until we can control ourselves, we are not safe for freedom, we are not safe for liberty."

LESSONS IN ADMINISTRATION

Experience in the administration of contracts between the federal government and the colleges demonstrated the superiority of a simple method of payment for instruction. That is, the form of a fixed rate for each individual trainee instructed for a specified

period is preferable to a complex cost-basis plan of payment. This conclusion was reached primarily because of the tremendous hidden costs for both the contractor and the armed services in negotiating, auditing, reviewing teachers' salaries, and examining cost data. Such costs were in no way compensated for by the slight gain that might accrue to the contractor under a system that employs a fixed rate.

In this regard, it is also considered most desirable, in the event of another emergency or in peacetime contractual relations with colleges and universities to strive for maximum simplification of procedures for determining specific use and rates of payment.

The manner in which feeding was handled is noteworthy and impels commendation for the contracting schools. Many schools were deprived from wartime participation in the programs, and for others the venture in feeding large groups was an entirely new experience. For most schools, mass feeding and the standards established by the military have had favorable reflections upon peacetime operation. Furthermore, since the cost of feeding represents the major portion of the total college training expenditures, schools which lack the standard feeding facilities should not be considered by the War and Navy Departments as potential training establishments, thus eliminating undesirable and expensive subcontracting.

The initial establishment of rates was an extremely difficult problem because of the variables from school to school. Subsequent revisions and adjustments of contract rates were not only beneficial to the services in determining more uniform rates, but were equally beneficial to the contract schools in enabling them to establish accurate financial records. In the future, many contract schools will definitely attribute their efficient and economical operation to the system instituted by the Joint Army-Navy Board for Training Unit Contracts requiring periodic cost analyses at all contract schools.

A postwar review of the expenses needed to activate or commission colleges and universities for Army and Navy training purposes indicates that for the most part schools were inadequately prepared to meet the wartime requirements. Illustrations of deficiencies frequently reported by inspecting Army and Navy offi-

cers include poor sanitary standards, insufficient knowledge of what constitutes a balanced diet, extravagant use of food both in preparation and in utilization of leftovers, improper ventilation, insufficient lighting, fire hazards, inefficient serving facilities, lack of proper study areas for trainees, and inefficient methods of buying supplies, the correction of which in most instances was costly. As a result of these standards, school administrators whose primary concern had been the academic program became increasingly aware of these new responsibilities. Administrators also gained insight into the fuller utilization of classroom space, into the practice of scheduling classes at odd hours such as the noon hour and the early morning and evening, into the per capita cost of academic instruction and in relation to the annual budget, and into efficient cost accounting of auxiliary services.

Finally, experience points out that in the event of future utilization of institutions of higher learning by the federal government, both the Army and Navy should, if possible, avail themselves of adjacent armed forces hospital facilities or, as an alternative, establish their own at each contract institution. This recommendation is based, not only upon the fact that military personnel require medical supervision in excess of civilian students in normal times because of the probability of disease and infection that regimentation inflicts, but also upon the fact that contractual arrangements for medical care did not operate to the financial advantage of the institutions. A review of the rates paid also shows that medical facilities operated in the training units by the military were more economical than those in other units operated by the contract schools.

One cannot deny that the administrative phases of the wartime experience greased the machinery for the postwar operation that we now witness in full gear.

The wartime college training programs developed unique techniques for the democratic selection of high caliber students on the basis of native ability rather than economic status. From this experience in the equalization of opportunity for higher education emerge debatable questions such as the following:

1. Is it just to deprive students who possess exceptional and specialized talent but reside in communities lacking publicly sup-

ported institutions of higher learning from additional opportunity for education?

2. Should the federal government finance—in addition to the GI educational program and the Army and Navy ROTC programs—a peacetime scholarship system for those possessing potential leadership and high intellect, in order to provide capable personnel in the vital fields of democracy and international relations?

3. Should federal funds be made available to the states as a means of expanding facilities for higher education?

It is exceedingly difficult in the United States to arouse concern among the people regarding the need for national policies in education. Following Pearl Harbor, our immediate concern was self-preservation, no matter what the cost. Public money was provided for defense training without the slightest hesitation. Yet if legislation to provide scholarships or adult educational programs, involving an equal or smaller sum, were proposed in the Congress in peacetime, considerable debate would be precipitated in spite of the tremendous dissipation of human resources now resulting from social and economic inequalities.

The wartime college training programs, with all their democratic implications for scholarships, may eventually result in permanent provision for federal financial aid to properly qualified prospective college students. If we as a people are aware that the greatest source of wealth today is our youth, it is high time that a national policy is adopted regarding equal opportunity for higher education for those who show superior talent and promise.

IMPACTS OF WAR ON MAINTAINING AND DEVELOPING RESEARCH

Scientific research undertakings contracted by institutions of higher learning accomplished the conservation and training of a relatively large number of young scientists; and the productivity of these enterprises stimulated the inception of national policies concerning the organization and financing of research which will influence future institutional research and graduate study. The war has taught the need for a unified plan for the selection, training, conservation, and utilization of those possessing the

potential abilities essential for the maintenance of America's leadership in scientific pursuits. The proposal to establish a national science foundation is a concrete effort to provide for this need and is a direct outcome of World War II. Such a foundation would be a dynamic influence in determining not only the future progress of scientific research, but also the character of graduate education for science in this country.

The fear of political domination of science and consequent loss of fundamental freedom of inquiry, the emphasis likely to be placed upon applied rather than fundamental research, the absorption of the best scientific talent into research rather than teaching, and the limiting effects of team or compartmentalized research upon individual creative ability are controversial issues that must be dealt with.

The graduate schools may be either the beneficiaries or the victims of the postwar program of higher education and scientific research. The war has shown that because of the increased mechanization of our armed forces and of our industries and because of our advances in the field of nuclear fission we cannot, without serious national loss, permit any interruption in fundamental or applied research. This implies that continuous planning must be carried on so that the training of scientific workers for the physical and the social sciences will at no time be curtailed.

Part Six

**CAN WE TEACH THE GI WAY—
AN ANSWER**

XVIII. EDUCATION AND RESEARCH: THE BASIS OF NATIONAL STRENGTH

THIS STUDY in no way can be considered as the final answer to many questions related to the armed services training programs. It has opened the door to many areas of research. Wide experimentation should be carried on in many areas. Studies should be made of Army-Navy test results. The influence of the armed services programs on certain minority groups represents another unexplored area. In fact, the study indicates the need for comprehensive studies in many special problems and programs and of educational adaptations now in effect.

The GI way as discussed in this study may be summarized briefly as follows:

1. It was knowledge stripped for action.
2. The end was always more important than the means to the end.
3. Traditional methods were abandoned with ease in order to produce results.
4. Clear and specific objectives characterized each integral part of the training program.
5. Learning by doing and realism in the learning situation generally were provided.
6. Constant supervision of teaching and learning prevailed.
7. Aids to teaching and to learning were developed on a huge scale.
8. Human talent was identified and, at least, every attempt was made to have the right person in the right place at the right time.
9. Constant evaluation of results was regarded as essential.
10. Class size in general was kept small.

But the lessons go further than the so-called methods. The significance of the armed services programs for civilian education, in spite of all the factors favoring them, lies as much in certain other areas.

We know that war is a powerful social force affecting the

economy, the conduct, the ideals of individuals and nations. Certain of the social consequences are temporary and may be observed only during the period of active hostilities and immediately thereafter. Others persist and result in more or less permanent changes in the work and life of a people. Conflict of nations comes inevitably to be a constituent factor—too often tragic—of the evolution of the culture of nations.

As modern nations and peoples now realize, warfare demands not only the complete mobilization and training of forces for defensive and offensive battle action, but also the skillful massing and maneuvering of technical, industrial, and emotional strength. In other words, war means the compulsory schooling of the entire population of a country. Such compulsory schooling is based upon programs of teaching and learning differing sharply as to content, methods, and objectives from peacetime schooling. Thus the phrase "implications of wartime military training for civilian education" immediately suggests a multitude of direct and indirect impacts of war training upon the lives of the people. This has been the purpose of all the foregoing chapters, namely, to identify the principal lessons which civilian education might learn as a result of so-called GI methods, procedures, and programs.

THE LESSONS OF HISTORY

This is 1947. The experiences of a quarter of a century before World War II contained a lesson for war that then should have been well learned. In February 1918 there was created within the War Department the Committee on Education and Special Training whose functions were "to study the needs of the various branches of the service for skilled men and technicians; to determine how such needs shall be met—whether by selection, draft, special training in educational institutions, or otherwise; to secure the cooperation of educational institutions of the country, and to represent the War Department in its relationship to such institutions; to implement plans of special training in colleges and schools as may be adopted."

A selection, more or less at random, of some of the statements

from the report of this committee of 1918 contains a parallel significance for 1940 and thereafter:

1. When the United States declared war on April 6, 1917, its regular Army numbered less than 120,000 enlisted men. Nineteen months later, when the Armistice was signed, the total number recruited for the Army exceeded four million.

2. The experience with this first call (August 1917) indicated that the Selective Service regulations needed some modification in order to increase the protection to essential industry of the country against needless disturbances.

3. It gradually became apparent . . . that the nation did not possess an adequate supply of technically skilled men to meet both the requirements of the military establishment and its essential supporting industry.

4. There should be established a permanent training division charged with the duty of supervising all training in the Army and of maintaining relations with civilian education everywhere to the end that the distribution of students over the various types of training may be such as to assure, so far as possible, an adequate and continuous supply of men of every type required by the military establishment.

5. To serve the nation effectively, education must not only train in skills and techniques, but it must also develop in young men and women an enlightened morale and must discipline them in willing team play for the common good.

6. Possibly the quickest way of stimulating the growth of the team-play spirit and of directing it toward peacetime would be through a universal service law that would require all young men and women to train themselves in some form of useful skill beneficial to the nation in case of an emergency. If such a requirement were made and if it were applied in the same thorough-going democratic manner as was the Selective Service law, it is reasonable to expect that its effect as a moral stimulant upon the nation would be no less profound than it was during the war.

The grim experience of 1941-45 proved the insufficiency of national learning of the lessons of 1917-18. Though the learning had been completed fruitfully, it must not be forgotten that

the tasks of 1941-45 were vastly greater and more intricate than those of 1917-18.

With the passage and application of the Selective Service Act of 1940 "a state of national emergency" resulted in an ever-extending series of rush requisitions upon the nation's resources and capacities for education and training. Manpower for combat, material for servicing armed forces, and morale for re-energizing an entire population demanded a volume and a variety of trained human ability far beyond a peacetime experience. Only a small part of the needed specialized and trained ability existed in usual form. It had to be produced or converted and then properly and promptly allocated to the armed forces or the industries or to the domestic economy. National training was the prime mechanism for the flow of national power through the channels of victory.

NATIONAL SECURITY POLICIES

The training programs established in and out of the armed forces point clearly to the matter of moment for the future national policy of security. Whether or not a plan for so-called universal service is adopted, the affairs of the world being what they are, this country must keep itself in a state of civic and industrial productive readiness for international emergencies arising either from armed conflict or from international economic competition.

One of the leading lessons of the war is that emphasizing the importance of trained manpower. Any planned national readiness will include a reliable live inventory of the kind, amount, and availability of trained skills of the working population. It will include, also, a proper balancing of the supply and the needs of these trained skills for the maintenance of national power in field and factory.

Any wide, sweeping overview of the training experiences during the war clearly suggests that a future selective service law should provide for the more economical allocation and conservation of the nation's stock of trained technical ability. Under the existing world technological economy, nations are compelled widely to have and wisely to use what, under favorable condi-

tions, will be an inadequate supply of highly trained technicians and scientists.

American educational policy should regard the training and education of each individual as having two purposes, the one not necessarily exclusive of the other. The first will consider the individual as entitled to have his inherent abilities and aspirations developed to the utmost; the second will consider the responsibility of the individual as a member of the economic, political, and social organization called the nation. It is the fulfillment of this responsibility whenever the national security is involved that must be recognized and provided for if the strain of the days ahead is to be withstood. The national policy should insure the capacity of each to fulfill this responsibility and to fulfill it completely and voluntarily.

Scientific Research and Education

The war experience demonstrated that research and training of scientific workers were no longer matters of established self-centered concern of individual laboratories, clinics, or industries. Each has a defined place in any plan for the mobilization of scientific power. It can be maintained that for higher education in the immediate future, the new aspects of research issuing from the war are already here. Especially critical is that element of the problem having to do with the relation of research to the effective training and education of a new generation of scientists and the teachers of these scientists.

Scientific research in all those fields from which might come an increase of the war power was greatly intensified throughout the war period. The climax of this research, of course, was the atomic bomb. This, it must be remembered, was the dramatic product of the complete national integration and cooperation of the genius and courage of civilian scientists and scientific institutions acting chiefly under the leadership of the war agency known as the Office of Scientific Research and Development. That the far-flung activities of this office have left an indelible mark on the present generation of scientific workers and their laboratories is evident.

The congressional effort to establish a national science founda-

tion with its authorization for the award of scholarships and fellowships to persons for scientific study or scientific work in any field of science, and its provision for the financing of research and development activities in the facilities of colleges and universities may become the most potent influence for determining the future character of American institutions of higher education, as these institutions embody the spirit of progress and study revitalization of scientific knowledge.

Educating Adults

The war has centered the attention of the whole of mankind upon the ideal of human freedom. Freedom of expression seems to have a new meaning for and a new influence upon the daily lives of the people. Thus it may be said that the agencies for the spread of information and ideas, as these were developed by the war, exerted new power for conditioning the minds and acts of the people. It may be easily and effectively argued that propaganda, so-called, is today the most potent force for social education. Here is a problem, the careful scientific study of which should not be neglected by the profession of education. From every point of view, the slanting of the civilian mind, through modern methods and mechanisms for the distribution of ideas and information has become the outstanding by-product of the war possessing many-sided implications for education at all of its stages. It is to be regretted that the circumstances of this study did not permit a proper consideration of the social-educational influence exerted by such an agency as the Office of War Information.

The lesson not only for schools and colleges but for libraries and other civilian educational institutions in this area of adult education should mean a greatly accelerated program. For example, the library should become even more effective an instrument of adult education. New kinds of programs and new ways of getting information to the people are needed.

Coordinated Planning for National Strength

In an atomic age it is impossible to prophesy whether, in the event of another national emergency, the circumstances will per-

mit the delay for training specialized personnel for the armed services. The lessons of the two world wars point to the imperative need for the adoption of a comprehensive and carefully coordinated peacetime reserve training program that will insure this nation's preparedness at all times.

The college training programs of the armed services in World War II and the Student Army Training Corps in 1918 had two things in common, namely, both were designed to supply professional and specialized personnel to the military forces and both were initiated after endless confusion, bungling, and delay. During two world wars our country has suffered from the absence of policy affecting the proper utilization of educational resources.

Our national security remains weak, unless the principal agents—education, industry, and the military—establish a planning board whose major responsibility is the national defense. This board should be vested with the authority for drafting a master blueprint which constantly will be revised in the light of international trends, and for recommending to the Congress training requirements, so that at any moment our trained manpower will be ready to function.

FEDERAL AID FOR EDUCATION

The war has given the American people a historic opportunity to judge the desirability of providing national scholarships as a permanent policy of the federal government. It also has re-emphasized the latent values in equalization of educational opportunities. As pointed out time and again in this report, ample funds provided to the military eliminated many obstructions to the development of programs merely because of this fact.

It is difficult to arouse concern among our people regarding the need for national purposes in education. Following World War I, educators were vitally interested in providing a program that would guarantee a more democratic society, while allowing every child an opportunity to develop his talents and abilities to the maximum. But following Pearl Harbor, our immediate concern was self-preservation, no matter what the cost, so large funds were provided for defense training without the slightest hesitation. If legislation to provide scholarships, adult educa-

tion programs—including libraries—or aid to the common school system involving an equal or less amount were proposed in peacetime, considerable delays no doubt would be initiated. Whether the wartime college training programs with all of their democratic implications may be considered to be the incentive for action on federal aid for education is a question, but there is ample evidence of the need for equalization of educational opportunity.

APPLYING THE AMERICAN GENIUS

Twice within a generation our United States has sent her sons to distant ports and to strange shores that free men might continue to remain free, that those who would impose a demagoguery and fanatical goals upon merciful men and benevolent nations be forever restrained, that out of the destruction of war there may evolve a new formula for the solution of the conditions that breed demagogues and nurture revolutions.

The totalitarian mind, a generation ago, began to spread its poisoned philosophy and unprincipled procedures world-wide by conquering school systems, operating centralized ministries of education, organizing youth nationally for service to the state, crushing free institutions, organizing a massive military machine; and dictatorship triumphed by creating an atmosphere of false security. The sovereignty of the people and the dignity of the individual became abandoned ideals. The state became the fundamental basis for living. Dictatorships do not arise from spontaneous revolution, but from single acts which when fully organized and nurtured reduce the individual overnight to a state of intellectual, moral, and even physical subservience.

Here was a nation at peace with the world today; one in which for several years few youth had been given the opportunity to work; in which ability was not utilized; in which we felt free to criticize our own institutions; and yet this nation was able to develop an armed service of approximately 12 million men and women representing the smartest armed force in the world. From automobiles and refrigerators, radios and gadgets, we translated our inventive genius and our productiveness into the instruments of destruction—we mobilized for total war. Com-

munities were fully organized for civilian defense. Community antagonisms and differences of long standing disappeared. We worked cooperatively for the common good.

In spite of total mobilization, however, we had differences of opinion between management and labor, we had criticism of existing institutions, we had spirited discussions of postwar planning; but there has been no fundamental abrogation of the fundamental rights of our citizens during the war period. We have done all this because fear has been the impelling force—fear of the loss of our liberty, fear of the power of totalitarianism, fear that we would lose all for which we have fought, bled, died, and sacrificed through these many generations in our country.

Only the fighting war is over. As these inevitable days of peace return, we shall be confronted with formidable problems from within. Shall we be able to mobilize our resources, human and material, our ingenuity, our inventive genius, our capacity to produce, and to direct our energy toward the solution of the problems that affect the enhancement of the dignity of the individual and that are concerned with the ultimate security of the nation? Have we the power to set aside our personal and group prejudices to plan for total peace? Shall we be able to develop a statesmanship in education in our country that will place the general welfare before vested interests? Shall we be able to profit by some of the training experiences used so effectively by the armed services? The challenge is here.

APPENDIX

APPENDIX

COMMITTEES AND CONSULTANTS

IN SEVERAL of the special projects undertaken by the Commission's staff, groups of experts rendered invaluable advisory and consultative service. At this point the various groups and their members are identified, and their assistance is gratefully acknowledged.

CLASSIFICATION PROCEDURES IN THE ARMED SERVICES

Helpful suggestions and comments on the manuscript of the study, *Utilizing Human Talent*, were made by:

Guy L. Bond, University of Minnesota
Herbert S. Conrad, College Entrance Examination Board
Donald W. Fiske, University of Michigan
Felix Kampschroer, War Department
Truman L. Kelley, Harvard University
Helen R. Haggerty, Navy Department
William G. Mollenkopf, Princeton University
Capt. Boyd C. Shafer, War Department
Dewey B. Stuit, State University of Iowa
Robert L. Thorndike, Columbia University

HEALTH AND PHYSICAL FITNESS

The members of the principal committee were:

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Charles Harold McCloy, research professor of physical education, State University of Iowa; formerly consultant to the War and Navy Departments
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Twelve additional consultants served in an advisory capacity:

Theodore P. Bank, president, The Athletic Institute, Chicago; formerly colonel, AUS
Henry W. Clark, general manager, Alaska Development Board; formerly colonel, AUS

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Willard B. Stone, associate education supervisor (recreation), New York State Youth Commission; formerly lieutenant commander, USNR

AUDIO-VISUAL AIDS TO LEARNING

The following individuals critically reviewed the manuscript of the report, *Audio-Visual Aids in the Armed Services*:

Alvin W. Chapman, director, Bureau of Radio Education, University of Texas; formerly lieutenant, USNR

Charles F. Hoban, Jr., director of visual education, Philadelphia Public Schools; formerly major, AUS

Francis W. Noel, director of visual education, State Department of Education, Sacramento, California

Paul Reed, director of visual education, Rochester Public Schools, Rochester, New York

Karl A. Reiche, superintendent of schools, Bristol, Connecticut

James W. Taylor, supervisor, Audio-Visual Aids Department, University Extension Division, University of Nebraska

Norman Woelfel, Training Aids Laboratory, Bureau of Educational Research, Ohio State University

CURRICULUM IMPLICATIONS

Five curriculum experts gave a critical reading to the first draft of the report, *Curriculum Implications of Armed Services Educational Programs*:

Daniel R. Davies, associate in educational administration, Teachers College, Columbia University

Carter V. Good, acting dean, Teachers College, University of Cincinnati
Carl W. Hansen, Teachers College, University of Cincinnati
Gordon N. Mackenzie, professor of education, Teachers College, Columbia University
George H. Reavis, assistant superintendent in charge of instruction, Cincinnati Public Schools

TRAINING OF WOMEN IN THE ARMED SERVICES

The following persons read and criticized the manuscript or appropriate chapters of *What Comes of Training Women for War*:

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